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MONTHLY REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR

APRIL AND MAY, 1874.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1874.

CONTENTS.

Page.

STATISTICS:

Condition of winter-wheat 179
Drilling *vs.* broadcasting 183
Condition of farm-animals 190
Condition of cattle 192
Condition of sheep 195
Losses of cattle and sheep 198
Diseases of farm-animals 201
Diseases of horses 201
Diseases of cattle 204
Diseases of sheep 207
Diseases of swine 208
French schools of agriculture 212
Facts from official sources 231
Market-prices of farm-products 231
Live-stock market 240
Foreign markets 241

ENTOMOLOGY:

Entomological record 221
Luminous beetles 221
Poke-root for destroying insects 222

CHEMISTRY:

Chemical memoranda 222
Passage of matter in plants 223
Liberation of ozone by plants 224
Sausages colored with fuchsin 225
Uredo, its chemical properties 226
Tannic acid as a wood-preservative 226

BOTANY:

Botanical notes 227
The flora of Colorado 227
Production in vessels 227
Production in cells 227

MICROSCOPY:

Microscopic observations 228

MONTHLY REPORT.

DEPARTMENT OF AGRICULTURE,
Statistical Division, April 18, 1874.

SIR: I present herewith, for publication, a report of the condition of winter-grain throughout the United States in the first week in April; a statement of the condition of farm-animals during the past winter, and of the prevalence and fatality of diseases among them during the past year; also an enumeration of the official schools of France, in the interest of rural industry, with a brief view of their constitution and status; the usual records of investigations in other divisions of the Department, and a variety of minor statistics.

J. R. DODGE,
Statistician.

HON. FREDERICK WATTS,
Commissioner.

CONDITION OF WINTER-WHEAT.

Four-tenths of the wheat harvested in the United States is fall-sown. The spring-wheat territory includes practically the six Eastern States, four Northwestern, and those of the Pacific coast. The former are of little importance in production, and the latter are not properly included in either list, sowing being continued from fall to spring in California and in winter and spring in Oregon. The four States, Wisconsin, Minnesota, Iowa, and Nebraska, now produce 90,000,000 bushels, or about one-fourth of the crop.

The present returns include the larger portion of the winter-wheat area. They represent the crop as more generally promising than at this period for several years past. The influence of sudden alternations of temperature, and of cold and drying winds, during the month past, has been almost the only drawback to the uniformity of vitality and higher condition of the wheat-plant in every section of the country. The winter has been so remarkably mild in the South, with almost entire absence of injurious changes of temperature, that the returns from Virginia to Texas are nearly unanimous in ascribing either average vigor or luxuriant growth to the wheat-area. In about one-fourth of the counties in the Ohio Valley an unpromising appearance is reported, while a majority represent in various terms a condition above an average. From Missouri and Kansas still fewer unfavorable returns have been received.

Though the wheat-product of the New England States is little more than a peck to each inhabitant, of which but one-twelfth is fall-sown, winter-wheat is sometimes grown in Aroostook, the most northern point in Maine, and it is common to obtain on new lands there a yield 50 per cent. higher than the usual average for the whole country. About half the winter-wheat of New England is grown in Connecticut, where the proportion of spring-wheat is only one to twenty. The small area sown has been less effectually covered with snow than usual, having been bare much of the winter, even in Maine and New Hampshire, with occasional thaws, and has suffered injury in consequence.

Six-sevenths of the crop of New York is seeded in the fall. Favorable reports are more numerous than unfavorable. The promise is good in Ontario; a fair expectation is entertained in Niagara; a better prospect than last year in Livingston; average in Genesee, though injured on low grounds by alternate freezing and thawing. These four counties produce one-third of the winter-wheat of New York. In Seneca the fields were full of promise until late in March, when the effect of cold winds and changeful temperature was apparent. Among other counties reporting favorably are Yates, Greene, Steuben, Chautauqua, Wyoming, Kings, Seneca, Rensselaer, Schuyler, and Suffolk. Wheat-fields have suffered considerably from the cold winds and alternations of freezing and thawing, in the latter half of March, in Albany, Montgomery, Warren, Saratoga, Schenectady, Fulton, Oneida, Sullivan, Otsego, Wayne, and Washington. In several northern counties, in which the back of winter was not broken, it was deemed too early for a reliable opinion.

Not one county in New Jersey reports an unpromising appearance of growing wheat. In Gloucester, the recent atmospheric changes have despoiled its dark green color to some extent. In Burlington it has improved in appearance throughout the winter, and looks now as if it would do the county credit.

In analysis of Pennsylvania returns but four counties present inferior condition, Erie, Forest, Jefferson, and McKean, while forty are characterized as "average," "unusually good," "very promising," "extra," "never looked better," notwithstanding the winter has been open and the ground bare for much of the time in many counties. This exemption is remarked as exceptional, and due to the absence of sudden and extreme changes. In many counties there are occasional fields, in undrained and unsuitable soils, badly frozen. Among these are Clearfield, Mifflin, Lancaster, Lycoming, Union, Washington, Luzerne, and Dauphin. In Wyoming the remarkable vigor of drilled wheat is noticed. The early-sown is in several cases reported superior to the late. The Berks correspondent thinks it "astonishing how nice it is, considering the open winter," and "has not seen one very poor field."

Little Delaware produces about one million bushels of wheat, and the promise this year is very good, counties ranging from average up to 50 per cent. better than last year. The Kent correspondent remarks its fine appearance wherever attention was paid to the preparation of the ground.

Fourteen counties in Maryland have indicated prospects ranging from fair to extra, and not one makes an unfavorable return. The cold winds of March have temporarily affected the appearance of many fields. The Queen Anne correspondent says: "I have never seen so good a stand of wheat, even in low and unfavorable ground, although continued rains in October prevented seeding until late in the autumn."

Returns from sixty-four counties in Virginia represent the prospect good at present for an excellent crop. No county fails to show average

condition. Wheat-growers generally are delighted with the prospect. Comparisons are frequently made with former crops, and some declare the crop finer at this season than in any April since 1860.

The cotton-States cultivate wheat sparingly, and only in counties which produce little or no cotton. Throughout the entire area the promising appearance of growing wheat is remarkable. We have never been able to report such uniformity of high condition, and only once, in 1871, anything approaching it. Scarcely a really marked exception is reported. Although many counties in North Carolina grow no wheat worth noticing, fifty-two reports represent a condition from fair to superior. Many give precedence to present prospects over those of springs from seven to ten years past. Some counties in the Carolinas and Georgia report an increased area. Alabama and Mississippi grow wheat in very small areas; in most of the counties none. It presents a fine appearance where it can be seen at all. In Bibb, Alabama, our correspondent was shown a stalk in bloom 3 feet in height, representing a field of three acres. In Lee, Mississippi, a field of eight acres is deemed worthy of special mention. Our correspondent there, in an experiment with a quart of wheat, which he sowed in a drill made with a bull-tongue plow, obtained wheat enough to seed six acres, and says he intends to put in thirty acres in the fall, as wheat will usually command $2 per bushel. Fifty-five counties in Texas report favorably, with the slight exception of the appearance of rust in Gillespie, McLennan, Victor, and a few other counties. A "rust-proof" wheat is cultivated in Tyler and other counties. A variety known as California wheat has done well in some localities for several years. In the northern part of the State, on the 1st of April, wheat was 6 to 12 inches high; in more southern localities 2 feet in height, and heading out. In many cases it made an excellent winter pasture, and is claimed to give better promise of a crop in consequence. Recent rains have wrought injury in some sections. The mildest weather and earliest spring in fifteen years is reported in Arkansas, and a vigorous growth of wheat in small patches, than which the memory of the oldest inhabitant is invoked to produce a more luxuriant. In Tennessee almost equal unanimity proclaims the finest prospect, reports ranging from "average" to "finest for years;" "best since 1857," and equivalent expressions.

In West Virginia a county upon the mountains, Pendleton, reports "a dry fall and poor start," but all other sections represent good condition, in some cases the best for fifteen years. Kentucky reports a very mild winter, unusual exemption from injurious alternations of temperature, and a uniformly good appearance of the growing crop. In some localities the unfavorable influence of March weather is slightly apparent.

Two-thirds of the Ohio counties make favorable returns. In Morrow fields look unpromising, but those well cultivated and seeded with the drill look best. It is noted in Henry that winter-wheat fails with the cutting off of the surrounding timber. "Better than for twenty years" is the record in Vinton; "best in ten years" in Gallia; "very fine" in Jefferson. Among the counties which have reported injury from alternations of freezing and thawing are Licking, Hancock, Shelby, Mercer, Richland, Starke, Van Wert, Lucas, Defiance, Hardin, Logan, Crawford, Wyandot, and Huron. The southern and eastern counties, with a generally rolling surface, have escaped much injury. The flat, wet lands of the north and northwest comprise most of the deteriorated area. The Franklin correspondent says:

Wheat, on proper soils for its growth, was never better. On lands poorly drained and badly tilled it is considerably winter-killed. In fact, on badly-managed lands this crop has

long since ceased to pay expenses. This, however, is the fault of the cultivation, and not of the climate or soil. I have known two neighbors, with fields of like soil lying together, with only a fence between—one would have thirty bushels to the acre while the other had less than five bushels per acre; one keeping his land up and making money, the other letting his land become thin, and he going in rags and becoming poorer each year.

Very few counties in Michigan have any cause to lament the condition of winter-wheat. With the exception of returns from Newaygo and Cass, and those of Branch, Berrian, and Lenawee, as to clay-lands, all are promising, most of them to an unusual degree. The opinion in Saint Joseph is, "The best in ten years;" "the best in twenty years" in Calhoun; and "never better" in Barry and Jackson. In the latter "the foot-stalks are very large, the leaf broad; the stools stand square and firm." In Van Buren timber-lands make the best show.

Fully 70 per cent. of the Indiana counties make favorable returns. Some of the exceptions are Decatur, Noble, Randolph, Hamilton, Marshall, Whitley, Steuben, Grant, Martin, Tipton, Wells, and Wayne. The clay soils are affected by freezing and thawing, the sandy soils and bottom-lands exempt. The prospect is claimed to be the best in forty years in Knox. The early sown is best in Brown.

Very few returns from Illinois are unfavorable. The early sown is almost uniformly in superior condition; in some cases late sown is a failure. The favorable influence of good tillage upon condition is repeatedly shown. The rough and changeable weather of March has been injurious in Grundy, De Kalb, Washington, Tazewell, Effingham, and Mason. In Franklin its healthy color and thickly-matted growth is noticeable. Six counties produce nearly a quarter of the winter-wheat of the State, averaging in a good year three-fourths of a million bushels each—Randolph, Macoupin, Washington, Monroe, Clinton, and Jersey—and of those all except Washington report condition from average to fine; Randolph (producing a million bushels usually,) marked "very fine."

Wisconsin, Minnesota, and Iowa, though producing in 1873 about ninety millions of bushels of wheat, do not together aggregate more than twice the amount of fall-sown wheat grown in Randolph County, Illinois, yet many people gravely speculate upon the prospects of the crop of winter-wheat in those States. Still there are favorable reports this year from Kewaunee, Washington, Sheboygan, Buffalo, Calumet, and other counties in Wisconsin; and Benton, Jefferson, Lee, Louisa, Appanoose, Muscatine, Decatur, and Clayton in Iowa.

Nearly all the wheat of Missouri is fall sown. For several years past its wheat returns have been unpromising, but there is very little cause for complaint the present spring. Some correspondents state that the prospect has not been better for thirty years. It is generally of good color, well rooted and vigorous. In Perry "croakers say it is entirely too fine for the season." The Polk County correspondent says: "Never looked better, but the chinch-bug is bound to take it. Millions of them have just put in an appearance. Every shelter for them during the winter was literally filled."

In Kansas almost equally flattering prospects are presented. But three counties, Nemaha, Miami, and Shawnee, report low condition. "Very good," "never better," and "best for eight years," and similar expressions characterize the returns. The Labette correspondent says, "It is as thick on the ground as can be, from four to eight inches high, affording excellent pasture for some of the half-starved cattle, without doing any harm either." The early sown is the best. Nebraska is not a winter-wheat State.

The California returns are of various import, some very favorable,

others discouraging. Strange to say, several correspondents report too much rain. "Good, except on low land;" "drowned by excessive rains;" "too much rain;" "winter has been so rainy there has not been enough sown to bread the county." Such are some of the returns relative to this land of assumed drought. Later returns will be more complete. The Mendocino correspondent says:

Seeding is not yet entirely done, the continual rains having prevented work on the low lands. There is but little difference here between winter and spring wheat. Winter-wheat brought from colder climates does not succeed well the first year. It grows and spreads on the ground until the dry season sets in, when it is ripened too rapidly. It, however, soon becomes acclimated, and after any given variety has been raised here one or two years, this characteristic disappears.

DRILLING vs. BROADCASTING.

The use of the drill for winter-wheat has become so prevalent that many intelligent people think the practice of sowing broadcast by hand has become quite obsolete. It is by no means the case. Information acquired through our correspondence shows that of the entire winter-wheat area, 52 per cent. only is put in with the drill.

"*Does drilling tend to prevent winter-killing of wheat?*" Repeated testimony in the affirmative has been received from our correspondents, which has commanded nearly universal acquiescence. Occasionally the negative has been assumed by writers for agricultural papers. In reviewing the deliberate utterances of our own correspondents, testimony has so accumulated as to settle the question beyond a peradventure. Opinions are found to differ relative to the amount of benefit derived from drilling, in different soils and seasons, but the general fact of advantage is affirmed by nearly all. The amount of advantage, expressed as a percentage, is estimated variously from 10 to 100 per cent. Calculated with referance to the quantity grown in each county, the average of all these estimates of increase is 10 per cent., which is equivalent to the total quantity of seed used.

In the principal wheat-growing counties of New York the benefit is acknowledged freely. In Genesee 15 per cent. is deemed a low estimate of its advantage. In Onondaga drilling is regarded as "the only proper way to put in seed; a great protection against winter-frosts, and saves one-fifth of the seed." In Steuben and Wayne the crop is 50 per cent. better than that broadcasted; in Livingston and Ontario 10 per cent. "A better growth in the fall" is reported from Monroe. "In fourteen years' trial drilling proved a benefit in every year but one," says our Wyoming correspondent; similar statements coming from Erie and other prominent counties, and from many which have a smaller area in wheat. The majority in Niagara, a county which sometimes produces a million bushels, think drilling prevents winter-killing, though some prominent farmers do not admit it.

Testimony is in the same direction in New Jersey, with the sole exception of the return from Monmouth. In Burlington an exception is naturally enough made relative to marshy land, where winter-wheat could scarcely be expected to survive the effects of submerging and freezing. Of county reports from Pennsylvania, only three deny positively the winter-protection of drilling, Lehigh, Clinton and Union. In Lehigh it is said that wheat was worse killed where it was drilled. It is deemed an undecided question in Bucks, Chester and Westmoreland. Drilling in Washington "prevents winter injuries to such an extent that portions of fields drilled last fall for testing this question produced fair crops, while portions broadcasted failed entirely." "A larger straw, better

berry and larger yield," are results of drilling in Luzerne. It is acknowledged in Delaware that it saves seed, yet some farmers still doubt the economy of drill-culture. In Snyder "nearly all the broadcast sowing was frozen out, while that drilled had deeper root and did much better." Our Wyoming correspondent "in fifteen years' experience, on a farm of 250 acres, never lost an acre of drilled wheat." Maryland reports indicate the superiority of drilled crops without a positive exception. Those from Virginia maintain a similar unanimity. The King George correspondent declares drilled wheat the best "from the coming up to the reaping." In Nelson, "drilled wheat is held to be proof against winter-killing if put in early," and even if late, is better than broadcast. A greater advantage on clay than on sandy soils is indicated in several localities.

In the cotton States drills are almost unknown. A few have been introduced into Texas, and in parts of Tennessee they are more numerous and deemed a decided advantage. In West Virginia and Kentucky, wherever used, they are credited with enhancing the supply of wheat.

Without exception the reports from Ohio acknowledge the benefit of the drill; in Williams only the qualification is added, "some doubt it." In Hardin a nearly double product is claimed; in Morrow "recent results of drilling have been more efficacious than ever before known;" in Highland it is found more beneficial in connection with deep plowing; in Hancock the recent product of drilled wheat ranges from 20 to 47 bushels per acre. The Logan correspondent says: "There are exceptional seasons, in which broadcast wheat does not winter-kill to any appreciable extent, but I should estimate that, on an average, drilled wheat will have the advantage of broadcast in withstanding the winter siege to the amount of 20 per cent. of the crop. Reasons: It is more uniformly placed at a depth that enables it to anchor its roots deep in the soil; and the ridges that the drilling leaves on each side of the wheat-bed are, by degrees, precipitated on the young plants, by the same alternate freezing and thawing that lifts the wheat, thus making use of the same means, at the same time, to counteract its injurious influence." A single correspondent in Michigan, representing Livingston, says: It does not prevent winter-killing, but rather increases it, the land being very flat, the furrows holding the melted snow. All other counties report a belief in drill-culture as a preventive of winter-killing. Its superiority is repeatedly claimed in seasons of autumn drought. Throughout Indiana the testimony is the same. Laporte alone says "No," but adds that the soil is sandy, and that wheat, either drilled or broadcast, escapes winter injuries. In one county, Perry, not a wheat-drill is found, but they are used very generally throughout the State. It is said in Franklin: "None but old fogies sow broadcast here, and they are scarce. No fact in agriculture is better established, than that drilling grain is a great improvement on broadcasting." The drill is credited in Ripley with an increase of 4 or 5 bushels per acre; in Jasper, with 5 bushels on low land, and 2 on high ground. Of thirty-two counties reporting relative to winter-wheat in Illinois, there is not a positive dissent to the theory that drilling is a winter protection. The benefit in dry seasons is emphatically asserted, and attributed to the deeper planting and the pulverization of the seed-bed by the drill. In Macoupin drilled wheat is assumed to be a sure crop, while that sown broadcast will winter-kill to some extent every winter, and probably entirely one winter in every three. In Clay County the advantage is stated at 15 per cent., though it is admitted that no benefit is received on certain clay soils, that become early saturated and "run

level." It is admitted in Lawrence that drilled wheat, often a good crop, when broadcasted is a failure. In Washington "broadcasting never yields half a crop," and is abandoned. In Richland "many decline to plant wheat unless it is drilled," and it is stated that the crop has been doubled since the drill has been introduced. The Schuyler correspondent reports an experiment, in which three acres drilled yielded 18 bushels per acre, while seven acres broadcasted were not worth harvesting. In Bureau, drilled wheat is sometimes winter-killed in prairie when it does well in timber.

In Wisconsin, Minnesota, and Iowa, there is no winter-wheat grown worth considering. The general belief is strong in the liability to winter injury, whatever the mode of planting. In some counties of these States there is a small portion of winter-wheat sown, and in several of these the advantage of drilling is conceded. In Lee, Iowa, which produced 95,326 bushels of winter-wheat in the census year, it is said that "last winter the drilled wheat stood the winter well and produced a good crop, while that sown broadcast was so much winter-killed as hardly to pay the expenses of harvesting."

In Missouri, returns cover forty-seven counties, of which only one (Platte) reports drilled wheat as unreliable as broadcast. In Benton "the only way to secure a crop" is by use of the drill. In Chariton it insures almost certainly a full yield, while broadcast wheat is often but half a crop; and in certain soils in Franklin it doubles the yield. "Drilled wheat is scarcely injured; broadcast wheat is half winter-killed," says the correspondent in Greene. In Marion, "last winter a marked difference appeared. Nearly every crop of broadcast proved a failure, while many crops of drilled yielded 20 to 25 bushels per acre; generally a difference of 30 per cent. in favor of drilling." In La Fayette, "during the last season, all drilled wheat made fair returns, while at least 50 per cent. of broadcast did not make a fourth of a crop." In Stone the advantage is placed at 33 per cent. if the drills run north and south. The explanation is, "when the drills run north and south, the sun at noon strikes the furrows on each side, thawing the frozen sides, and the dirt falls in and keeps the roots covered."

The verdict of Kansas is decidedly in favor of the drill. Very few counties give opposing testimony. Marion objects. Dickinson says, "All wheat winter-killed last winter;" and Lincoln reports "drilled wheat winter-killed worse than broadcast." Droughts in autumn, which are not unfrequent, are less injurious to wheat where the drill is used. From Nemaha the report is, "Five per cent. of drilled wheat is killed; 30 per cent. of the broadcast." In Cherokee "great destruction of broadcast; 15 per cent. of the drilled." In Coffey, 50 per cent. of the acreage is drilled and 95 per cent. of the product. In Montgomery "nearly all the broadcast is killed." In Shawnee the preference is expressed for drills running east and west, because the prevailing winds are north and south, and the injury from displacement of earth is less. A farmer in Jefferson says he once put in 80 acres of winter-wheat, and "got 27.73 bushels to the acre." His neighbors sowed broadcast, and "not one had good wheat." He says he has "raised four crops in succession without winter-killing," while his neighbors have had their crops "frozen out."

Drills are not much used in Nebraska, and scarcely at all among the mountains or on the Pacific coast.

The following table gives the number of counties reporting; the proportionate area represented compared with the entire winter-wheat area of each State; the proportion of this area sown and drilled, respectively; the estimated increase of product by drilling over that obtained by

sowing; and the estimated quantity of seed used per acre, respectively, in these modes of seeding:

States.	Area represented.		Proportion sown.	Proportion drilled.	Increase of product by drilling.	Seed per acre.	
	No. of counties.	Percentage.				Bushels in broadcasting.	Bushels in drilling.
New York	21	63	50	50	13	1.80	1.60
New Jersey	10	22	45	55	6	1.95	1.60
Pennsylvania	33	62	30	70	12	1.74	1.49
Delaware	2	43	26	74	10	1.75	1.50
Maryland	8	66	24	76	7	1.70	1.43
Virginia	29	35	62	38	12	1.44	1.21
North Carolina	18	26	97	03	.....	1.07	.83
South Carolina	4	.....	99	01	.....	1.00	.70
Georgia	16	14	99	01	.....	1.00	.90
Alabama	8	.....	99	01	.....	1.00	.....
Mississippi	5	.....	99	01	.....	1.25	.....
Texas	9	21	98	02	.....	1.18	90
Arkansas	2	.....	100	.....	.....	1.10	.....
Tennessee	27	37	96	04	10	1.20	1.10
West Virginia	17	57	58	42	12	1.53	1.33
Kentucky	23	22	92	8	10	1.36	1.11
Ohio	38	51	39	61	16	1.57	1.33
Michigan	22	52	49	51	9	1.62	1.40
Illinois	32	39	24	76	19	1.52	1.24
Indiana	41	44	49	51	15	1.48	1.21
Missouri	47	45	62	38	21	1.52	1.21
Kansas	23	36	55	45	16	1.49	1.23
Nebraska	2	4	51	49	17	1.56	1.25
California	9	.....	98	02	.....	1.33	.....
Oregon	7	21	81	19	5	1.50	1.21

SPRING WHEAT.—The proportion of spring wheat sown is about 40 per cent. of the whole crop. It is grown mainly in Wisconsin, Minnesota, and Iowa, almost to the exclusion of fall-sown wheat in those States. Michigan, though as far north as either, produces almost exclusively winter-wheat, owing to the modifying influences of the surrounding waters, and perhaps in some degree to the soil, much of which has good natural drainage. One-third of the crop of Illinois, (in the northern counties,) is spring-wheat. A small portion of that of Kansas is sown in the spring, and nearly all of that of Nebraska. California is anomalous in wheat as in everything else. Wheat can be sown all through the summer to sprout when rains fall, or it may be put in all through the rainy season till spring. In point of fact, the planting season has actually a range of several months. The little grown in the New England States is nearly all spring-wheat. In the Middle and Southern States, and in the Western States not named above, fall sowing is almost the exclusive practice. A little is sown in the spring in New York and Pennsylvania.

A considerable portion of the farmers of New England, including some of our correspondents, have never even seen a drill. One report from Vermont (Grand Isle) makes the yield of drilled double one year, while the next showed little difference. In Aroostook, Maine, new land often yields 20 bushels per acre with broadcast sowing.

The use of the drill is nowhere the predominant practice in the spring-wheat region. Our returns cover nearly one-half of the area of spring-wheat, and the proportion reported drilled is found to be 39 per cent. in Minnesota, 38 in Wisconsin, 21 in Iowa, 11 in Illinois, 49 in Kansas,

and 7 in Nebraska. The average proportion of spring-wheat drilled throughout the country is 30 per cent. A still larger proportion is seeded by the use of some style of broadcast seeding-machine, leaving the remainder to be sown by hand, mostly in lands having stumpy or uneven surfaces, where fields are small, or where new farms have been opened, and cultivation attempted before the pioneer could find means to procure drills or seeders. A very small proportion is actually seeded by hand, far less than in the cultivation of winter-wheat. In the Eastern States, to a considerable extent in the Middle States, almost exclusively in the Southern States, and in the region south of the Ohio, hand-sowing is practiced; and when a machine is used in putting in winter-wheat, it is generally a drill, very rarely a broadcast seeder.

Various forms of broadcast seeders, which are a great improvement on broadcast sowing by hand, are used in the West. They have come in since drills, and for spring sowing have displaced them in many localities. A principal reason assigned for this preference, especially in corn-growing Illinois, is their better adaptation to sowing after corn, without plowing, which is a prevalent practice. It is slovenly but cheap, and a scarcity of farm-labor compels its adoption by the average farmer. Our Kankakee correspondent says that "farmers who drill winter-wheat, broadcast their spring crop, and declare that corn-land harrowed in grows less to straw and is less liable to fall down."

There is another ground of opposition to the drill, which is a direct confession of slovenly farming. It is very common in the whole northwest, and appears to constitute very prominent objection. It is that the drill leaves between the rows wide spaces "in the best possible condition for the growth of every kind of weed." In the case of the corn-land, the mellow row-spaces are already full of weeds at the time of planting, and their presence and future growth are the result of the absence of all preparatory culture, with which the drill has no connection whatever. As the drill alone, running among grass and weeds, over corn-hills, was found to be impracticable, a compromise was made between negligence and labor, and a cultivator and broadcast seeder were combined to accomplish the least amount of work admissible at the lowest cost; and as this sort of culture is the rule in the spring-wheat region, the seeder largely predominates, the drill being used only in sections where more thorough culture prevails. It is admitted generally, throughout this region, that in dry soils the drilled wheat, which is put in at a uniform and greater depth, gives more satisfactory results. In Dane County, Wisconsin, it is declared that "drilling does as well always, and in dry seasons better." If a dry, sandy field is late sown, it should be drilled, says the Pierce County correspondent. In Saint Croix it is affirmed that "in dry ground, or when dry weather follows, drilled wheat produces four or five bushels more per acre. In Fillmore, Minnesota, a great wheat-growing county, our correspondent asserts, from an experience of fourteen years, that "drilling produces three to five bushels more per acre, with one-eighth to one-fourth less seed." In Olmsted it is thought "drilling is not superior to broadcasting, except in dry seasons." Our Houston correspondent prefers a mixed practice, deeming it "a good plan to drill both ways, one way east and west, that the weeds may be more shaded, and then cross-drag to scatter some of the grain." In Nicollet the drill "is best if fields are kept clean." In Freeborn the seeder "is most used, worked among grubs, stones, and in wet land, but the drill is best in dry soil." Similar views are reported throughout Iowa. Four-fifths of the area is sown broadcast. It is universally believed that the seeder is better

than hand-sowing. Some prefer plowing in. For dry soils preference is expressed here, as elsewhere, for the drill. Our correspondent in Jasper, from a long experience, gives ten per cent. preference to the drill. In Tama the seeder is used, but fall plowing of corn-land gives better results than spring plowing. In Marion, "drilled wheat has stouter growth of stem, it tillers better, the roots reaching moisture." Our Hancock observer thinks he could grow winter-wheat with drill-culture. In Leavenworth, Kansas, the reporter thinks the practice of drilling promotes better culture, as the ground must be in good order to use the drill advantageously. The importance of drilling, as a preventive of the effects of drought, are enforced repeatedly by Kansas correspondents. The light soils of Nebraska are deemed well suited ot drill-culture. The following extracts illustrate some of the main points in seeding:

Mercer, Ill.—Owing to the fact that nearly all our spring-wheat is sown broadcast upon ground previously occupied by corn, and upon which a drill could not work, many drills were introduced and thoroughly tried several years since. All are now thrown aside to rot in fence-corners. I have known but one piece to be drilled in fifteen years, and the party doing it has not repeated the experiment. It is so seldom that they can be used, either for profit or convenience, that it does not pay to keep the machine. The time may be approaching when we shall adopt summer-fallowing and winter-wheat, and with it the drill; but while we have the cattle of the West to stall-feed, we shall raise wheat only to prepare our ground for grass.

Steel, Minn.—Formerly all spring-wheat was sown broadcast. The best farmers now have changed to a great degree their practice. If the ground is in good working condition and clean, there is a general concurrence that drilling is best. Some use a broadcast machine, because they can hurry in the early spring, and put the grain in before the ground is dry, even before the frost is out but a few inches. The only other objection to drilling that is much urged, is that it gives the weeds a much better chance to start and grow between the drills of six inches than if the seed be evenly scattered. This, it is acknowledged, is only occasionally the case, as in the season of 1871, when there was a hot, dry time in May and June, and even then weeds were perhaps as vigorous and numerous in the broadcast sowing. These are the objections I hear urged, but the opinion is prevalent that these statements are at least but partially true, and that the deeper covering of the seed, and the less seed necessary, are both positive advantages; and, further, the great test that drilled seed, on the whole, produces the best crop. Some farmers think that the drills only four instead of six inches apart would give better results.

Hardin, Iowa.—I have followed both drills and broadcast seeders over hundreds of acres for the sole purpose of observing which did the best work. I find that when the soil is just right as to moisture, the drill covers best, hardly a dozen grains remaining uncovered to a square rod; but if the soil is rather wet it *will not fall back* properly so as to entirely cover the seed deposited in the bottom of the furrow, and, if the ground is foul with roots, weeds, or stubble, poorly turned under, and rather too wet, the points of the drill-teeth clog badly. Most good farmers will say you must not sow your seed then when the soil is too wet, which is very true in most soils, especially clay or clayey; but every one hereabouts who has tried it, has found that when the time comes for sowing, the condition of the soil as to moisture, at least as to being too wet, is of little consequence, so that *time* seems to be the "essence of the contract" more than condition of soil.

I first observed this in the spring of 1867. I went twice across a field (eighty rods) with a broadcast seeding-machine, making a strip one rod wide, or just half an acre. The ground was so wet that the horses sunk to their fetlocks at every step, and seemingly one-fourth of the grain remained uncovered, as the soil worked up by the seeder-teeth appeared more in the condition of mortar than like a proper seed-bed. So I quit for two days, until the sun and wind had dried out the land properly, when I resumed work with the same machine, same seed, and same rate of seed per acre, and finished the field of forty acres in the same way. None of the land was harrowed after the sowing. The strip first sown came up first, looked better, and kept ahead all through the season, showing a plain difference at a distance of one hundred rods, so much so as to attract the attention of almost every one who passed. Thinking that I had discovered something, I harvested the first-sown strip separate, and another strip of the same size also separate. The result was, the first-sown strip, half an acre, yielded eleven bushels, and the other strip nine bushels. Another farmer, living about three miles from me, made the same discovery the same season; and every one who has tried the plan, to "put in their wheat in time," as they call it, without reference to the condition of the soil, even when hardly thawed enough to cover the seed, has confirmed the wisdom of the practice.

Labette, Kansas: We have harvested but six crops from our broad, unfenced fields of

this county. The first four were sown all broadcast. The ground was then very rough and the country new, and no machinery of any kind was used in sowing or harvesting. From the roughness of the ground, which was somewhat of a shelter to the crop, the stand was generally good. In our fifth crop—the sod was by this time all rotten and the ground very smooth and level—we found that by sowing it broadcast, our process of "dragging" it in did not bury the seed deep enough, and that our violent northern winds blew what little dirt there was from around the roots of the wheat, and in many instances blew the plants entirely out of the ground or left them merely hanging by one or two roots, from which but a poor stalk or head could ever be harvested; hence our crop of 1871 was a failure in many places. In sowing our sixth crop many conceived the idea of deep drilling, and from actual observation and experience the following facts are evident. Wheat that is drilled in deep, east and west, and not rolled after, is equivalent to the planting of it in small trenches and deep enough in the ground to draw plenty of moisture; and as our strong winds are either from the north or south they will in this case pass directly over the drill s of wheat in the trenches without doing any injury whatever, as the roots are so deep in the ground as to be below the force of the winds, and the dirt on the sides is blown into the trenches, thus planting the roots deeper into the ground and saving it from the frosts that winter-kill our wheat. The trenches that the drills make also answer admirably for surface-drainage, in connection with some main furrows that should be opened, north and south, with the plow, and cleaned up with the shovel. This county intends in the coming wheat-crop to test fully the efficiency of drilling over broadcast-sowing, Of the last crop, nine-tenths was drilled. *Nemaha:* The advantages of drilling spring-wheat over broadcast-sowing are so evident here that no farmer who can get the use of a drill will have his wheat put in otherwise. The same is true of other grains. About the time of spring-seeding here there is much windy weather, and the most expert hand fails to distribute the seed evenly over the ground, the grain coming up in thick and thin streaks. The thick will ripen first and produce an inferior quality of grain, while the weeds will grow in the thin places. The uneven depths of covering of broadcast-sown grain is a great disadvantage to the crop, causing it to grow and mature unevenly, while some drills leave the surface of the ground smoother and in a better condition for the harrow. In 1858, when this county first began to settle up, many of the best farmers tried spring-wheat broadcast, for several years, with but partial success. Some were nearly discouraged, but, having procured drills, the same men have become the most successful wheat-growers in the country, and annually market hundreds of bushels of the finest wheat. A gentleman in this town (a good farmer) for several years tried to raise spring-wheat and other grain by broadcast-sowing, only partially succeeding; he finally concluded it was not a good country for wheat, and sold his farm. The purchaser uses the drill, and succeeds every year on the same ground where the other failed. The use of the drill is an advance step in the progress of agriculture. No country is better adapted to its use than the prairies, and the time is near when it will be as indispensable to the well-ordered farm as the wagon.

SUMMARY.—The following conclusions are presented:

1. Fifty-two per cent. of the winter-wheat and thirty per cent. of the spring-wheat, or about forty per cent. of the aggregate of both kinds, represent the proportion seeded with a drill.

2. Nine-tenths of the testimony given asserts the superiority of the drill for winter-wheat.

3. An average increase of one-tenth in the yield is assured by the use of the drill.

4. A large majority of observers declare that, in most soils in which injury resulting from frost is liable to occur, drilling prevents or reduces the loss.

5. The majority assert that in certain clay soils with rolling surfaces, some advantage accrues in surface-drainage by the use of the drill; while in some heavy soils with flat surfaces the water freezing in the drill-furrow does positive injury.

6. The broadcast-seeder predominates in spring-wheat regions, because better adapted than the drill to seeding in unplowed corn-fields, on rough surfaces, and in weedy fields.

7. About one-sixth of the seed-wheat (or 5,000,000 bushels for the crop) might be saved by the exclusive use of the drill. The average quantity of seed used per acre in seeding winter-wheat is 1.38 bushels.

8. The drill is used for seeding in connection with thorough culture, especially in winter-wheat growing; the broadcast-seeder for imperfect culture and rough surfaces; and sowing by hand is the method adopted for small patches and first efforts of impecunious pioneers.

CONDITION OF FARM-ANIMALS.

The winter of 1872–'73 was extraordinary for the steady coldness and dryness of its temperature, except on the Pacific slope, where it was unusually mild, and in Texas, where cold storms prevailed to an unprecedented extent. These conditions were reversed the past winter; on the Pacific slope it was one of the severest and most protracted ever known, occasioning great suffering and loss of unsheltered and unfed stock, while in Texas farm-animals, without either shelter or feed, have not only escaped any considerable suffering from exposure and hunger, but have improved in condition. In the remainder of the country the winter was unusually mild, and in the Mississippi and Ohio Valleys, especially, wet and changeable. This statement, however, must be qualified by the fact that throughout Northern and Northwestern States the month of November was the coldest and most snowy for many years. This necessitated the bringing of stock into winter-quarters early and a very long season for feeding. On the whole, the winter has been exceedingly favorable for farm-animals wherever there were adequate provisions for sheltering and feeding them in such exigencies as required it. Except in a few limited localities affected by drought the crops of grain, hay, and rough feed were sufficiently abundant to take away all excuse for scant feeding, and, excepting the same localities, fall-feed was unusually good, so that cattle and sheep went into winter-quarters in more than ordinary flesh and vigor. Owing to the mildness of the winter it has required less than average feed to keep up and improve their condition. And even in localities visited with scarcity, by saving rough feed and supplementing any deficiencies by timely exchange of surplus animals for provender, it has been practicable and profitable to bring stock through the winter without depreciation. From Laclede, Mo., the condition of cattle and sheep is reported as better than for many years, and the losses 50 per cent. less than the average.

The reason is that the farmers took better care of their stock than ever before. Last fall feed was so scarce that our farmers feared they would be unable to get their animals through the winter. The result has been that they saved their feed, took special care of their stock, and have brought it through in better condition than ever before.

But while the past winter has been exceedingly favorable for stock properly sheltered and fed, it has been characterized by greater humidity, and has been in that respect more trying to the unsheltered than the preceding. In Kansas, Woodson reports sheep well cared for in good condition, but others poor and dying of starvation, and cattle miserably poor and rough-looking. The correspondent adds:

No one pretends to house cattle here, and the cold, pelting rains and snow-storms have laid their long fingers on the poor brutes the past winter. Estimating the total number of cattle one year old and over at 14,500, and the loss in condition, both as to flesh and health, at $4 per head, we must sustain a dead loss of $58,000. The recuperating process has not yet commenced, and midsummer will be reached before the loss in flesh and vigor will be made up, so that the season for growth and profit will necessarily be very short.

The Miami report, representing cattle as "dried beef on foot, owing to lack of proper shelter," and sheep as "thin and feeble for want of shelter for them and for their feed," and the loss 10 per cent. greater than the previous winter, states that the open, wet, changeable winter damaged corn and hay (which is again damaged by being trampled in the mud and dung, in the process of feeding) as well as cattle directly; and the conclusion is that "farm-stock endure the rigors of a cold, dry winter much better than an open, wet one," which is, perhaps, equivalent to saying that, as a rule, to winter stock without shelter, in North-

ern Vermont and New Hampshire, would involve less suffering and disaster than in Southern Missouri and Kansas. That from Ottawa states that the well sheltered and fed are in excellent condition, the loss not exceeding 1 per cent. "Of those with plenty of feed, but without shelter, the loss is probably 10 per cent.; of those without shelter and with little or no feed, 30 per cent." And yet, owing to the fact that "more care was taken to provide feed and shelter, the loss was only half as great as the previous winter." That from Neosho represents that "cattle are very thin for want of food, and unless grass comes soon many will die," for the reason that "farmers did not put up a sufficiency of hay, though there was an abundance to be had for the cutting."

But the most disastrous results from failure to provide for sheltering and feeding stock have been west of the Rocky Mountains. In each of the fifteen counties reporting from California, and in ten out of eleven reporting from Oregon, cattle and sheep are below average in condition. The reasons for leaving stock to the provisions of nature, unassisted by man, for protection and food in winter, are stated in the return from Mendocino, California:

> We have four or five consecutive winters in which sheep and cattle will do well without any feed or housing; but occasionally this is changed, and we have almost incessant rains in the valleys and snows on the mountains for four months. Such has been the past winter. Our stock-raisers become so accustomed to neglect to provide feed and shelter, that, when these seasons come, they are entirely unprepared, and stock dies by hundreds.

To say nothing of losses in products, offspring, flesh, and vigor, and of transmissible weaknesses of constitution, the direct losses by death in this county are placed at 20 per cent. of the cattle and about 30 per cent. of the sheep. The report from Santa Clara states that constantly-inclement weather has "caused stock of all kinds to suffer, unless provided with shelter, and only a small portion have any except what nature provides."

Among the counties losing most heavily in wintering, the returns from the following are sufficiently specific for a calculation of numbers lost on the basis of the assessor's returns for 1873, which are understood to be very incomplete with reference to all kinds of stock:

	No. cattle.	Per cent. lost.	No. lost.
Mendocino	25,195	20	5,039
Stanislaus	7,620	10	762
El Dorado	8,905	17½	1,558
Humboldt	28,589	33	9,434
Total	70,309		16,790

This makes an average loss of twenty-three per cent. in these counties. If the loss throughout the State should prove as much as ten per cent., it would prove a serious injury to the agriculture of the State, and a reproach to the providence and humanity of her citizens.

The report from Douglas states that the losses of cattle and sheep are 150 per cent. greater than last year, and that the surviving ewes are generally too poor to raise lambs, and adds:

> Nine out of every ten of the cattle and sheep lost in this county the past winter should be put down to starvation. There is nothing provided for them in the summer. All look for early rains to start the grass and for a mild winter to keep it growing; and when the reverse of this occurs, as in the past winter, loss by starvation is inevitable. I have wintered quite a large stock without any loss to speak of. One cow, by accident, and one from a swelling

at the root of her ear, is all the loss out of a stock of 116 head. I commenced with a flock of 1,100 sheep, and have fully as many lambs as usual. My losses are confined to a few old ones and those killed by dogs.

From Whitman, Washington Territory, the report states that cattle as a general rule make their own living on the bunch-grass, and that the winter has been the hardest one on stock since that of 1861–'62, when 50 per cent. of the cattle in that part of the country east of the Cascade Mountains perished. It furnishes the following illustrations of the folly of neglect:

One man brought from Oregon 1,100 sheep, and, without feed or shelter for them, he has now less than 300. A neighbor, who had nearly 300, prepared good, warm sheds and plenty of feed, such as hay, oats, beets, parsnips, &c.. During stormy weather he fed well. His flock came through with a loss of only two, and they died from injuries.

The return from Ada, Idaho, represents that though the winter in that Territory has not been excessively cold, it has been unusually long, and as "but little food and no shelter is provided, it has been more severe on cattle and sheep than any winter since the Territory was settled."

CONDITION OF CATTLE.

Among the thirty-six counties reporting definitely, from New England, Kent, Rhode Island, returns average; all the others range above. The prevalent thrifty condition in Maine is largely accounted for by the return from Piscataquis: "Farmers are taking better care of their stock; they are more regular in feeding, and take more care to keep them gaining through the winter; they have discovered that it does not pay to let cattle get poor, it takes so long, and so much feed, to get them up and gaining again." In Carroll, New Hampshire, "farmers begin to find that it pays to winter only what they can keep in a thriving condition." Also in Berkshire, Massachusetts, that "by prevention of exposure to storms, and by keeping up a moderate, even temperature, the cost for food is diminished, and the health of animals materially benefited. In Kent, Rhode Island, a gradual improvement in condition through the winter is secured by feeding more roots and corn-meal than formerly.

In the Middle States the general condition indicated is also one of remarkable thrift. The exceptions noted are very few. A scarcity of feed in Washington, Suffolk, Livingston, and Genesee, New York, has caused loss of condition; a similar deficiency, resulting from drought, in Talbot, New Jersey, caused like deterioration; and comparative leanness has come upon the kine of the counties of Wyoming, Westmoreland, and Warren, Pennsylvania, in the latter owing to the light hay-crops and high price of corn; an average condition exists in Dutchess, New York; in Bergen, New Jersey; in Columbia, Dauphin, Juniata and McKean, Pennsylvania; and in Cecil, Maryland. All of the ninety other counties in these States making specific returns on this point report condition higher than average. It is mentioned that more grain than usual has been fed to cows in Montgomery, New York, and that the flow of milk has been correspondingly liberal; and in Otsego, that selling prevented starving, leaving the remainder in fine order. Roots prevented ruin in Union, New Jersey. Well-stabled cattle of Berks, Pennsylvania, lived high on meal and bran. Maryland shows only in Talbot poor stock; in Carroll medium; in twelve other counties high condition, particularly in Frederick and Prince George.

Rarely has a more favorable winter for unsheltered farm-animals been known in the Atlantic States, south of the Potomac and the Gulf States. Of sixty-three counties in Virginia, fifty-three place condition of stock above average, and only one claims poor cattle. This improvement is attributed to increase of forage and attention in Suffolk, an actual gain of flesh during the winter is claimed in New Kent, and in Middlesex, cattle look as well as when in the flush pastures of June, while some are "fat enough for the butcher," in James City. The feeding value of turnips is strikingly manifest in Southampton. North Carolina is represented by fifty-four of her counties, of which only Caldwell and Stanly have thin cattle, and Wilkes divides fat and lean by partition of "shelter." Only two in South Carolina, Marlborough and Greenville, report thin cattle, because unsheltered and unfed. Eight reports of cattle poorer than usual appear in a list of fifty-two from Georgia. Superior condition in Sumter comes from increase of attention. In Troup, Columbia, Catoosa and Carroll condition is modified by too close proximity to starvation. In Jackson, Florida, condition is characterized as "moderate;" it is more moderate still in Columbia; in other counties from good to fine. No unfavorable report comes from Alabama; in several instances cattle are reported fat. Lee and Jefferson in Mississippi make the only reports of low condition in that State; nearly all indicate some degree of superiority. Among counties standing highest are Attala, Amite, Jasper, Jones, Lafayette, Marion, and Yalabusha. Stock is reported thin in Franklin and Rapides Parishes, Louisiana; average in Assumption and Caddo; in all others superior. We have fifty-seven county reports from Texas, in all of which condition is better than usual, in many instances very fine. The tendency to improvement of stock, by breeding and better care, is manifest throughout Western Texas. In some cases, as in Bell, Cooke, Fannin, Hardin, Kauffman, Refugio, and Williamson, very good beef may be taken direct from the prairies. Remarkable condition is claimed in Bosque, Bell, Bexar, Collin, Grimes, Galveston, Medina, Navarro, Parker, and Smith.

One report among twenty-six from Arkansas, that from Union, alone indicates leanness. The buffalo-gnat, as usual, is very troublesome, and in some cases fatal. In Tennessee only six reports are comparatively unfavorable; from Campbell, Grundy, Hardie, Murray, Smith, and Union. In these, sheltered cattle are in good order. Reports from thirty-eight other counties indicate health and thriftiness, in a measure unusually large in Dickson, Johnson, Lawrence, Obion, and Wayne.

Coming to the Ohio Valley, an equally satisfactory state of things exists in West Virginia. Monroe and Pleasants have felt the effects of scarcity of feed. Mercer has only a medium report, in consequence of exposure to too much humidity. All other counties, numbering twenty-eight upon the record, represent condition as superior.

Kentucky fails to make so fair a record, yet a majority of the returns are favorable. Among those least so are Lewis, Russell, Owsley, where feed is scarce and grain high; and in some cases a degree of mortality is reported.

Wet and changeable weather has been unfavorable to high condition in Ohio, and stock too much exposed show its effects; yet nearly six-sevenths of all reports represent either medium or superior condition. A want of better barns and shelter for fodder still exists in many sections.

In Michigan, Calhoun, Cass, Macomb, and Oakland, report comparative leanness; Branch, Ingham, Manistee, and Ottawa, full medium condition; and nineteen counties, a still higher degree of thrift.

In Indiana and Illinois the general condition resembles that in Ohio, and for like reasons. In the former State out of forty counties twenty six return a condition above average; Decatur, "rather poor on account of the great amount of rain and mud through the winter;" Hamilton, poor, "the warm, wet winter being unfavorable for out-door feeding;" Gibson, Warren, Wells, and Pike, thin but healthy.

In Illinois seven counties return average condition, ten below and thirty-five above. In Effingham, there being an unusual amount of rain-fall, "stock of all kinds not sheltered have not done as well as usual;" In Ogle the weather in March was hard on cattle not provided with shelter; in Richland bad crops and changeable weather have conspired to make cattle poor; and in Mercer they are poor from scarcity of grain and forage, the stalk-fields having been rendered nearly worthless by drought last season; in McHenry, "lean, owing to the condition in which they went into winter-quarters, occasioned by scarcity of pasture last autumn;" rather poor in Rock Island, for a like reason. In De Witt they were never seen looking so well as this spring; Randolph, ten per cent. better than for several years.

From Wisconsin, Minnesota, and Iowa the returns of condition are almost uniformly favorable. Whether from more general provisions for housing stock and feed, or from more favorable meteorological conditions west of the Mississippi, there is no complaint of damage from wet weather. Of twenty-nine counties in Wisconsin all except Adams and Washington report higher condition.

Among thirty returns from Minnesota, Faribault alone is below average, and that slightly; the winter mild but very long, and coarse grain scarce and high. Isanti, in which hay had been fed up to April 1, "just six months," reports average, but "many are very poor, chiefly from neglect." Chippewa reports that all are stabled and the condition first-rate. The same in Martin, Douglas, Fillmore, Murray, and Waseca.

From Iowa fifty returns have been received; six of which range below average; nine from fair to full average, and thirty-five from good to superior. In this last grade are Jasper, Taylor, Louisa, and Allamakee. In Pottawattomie cattle are not in as good flesh as usual, but "those fed principally on corn-fodder and straw are in better condition than those fed on prairie-hay." Muscatine reports that cattle are thinner than for some years, for the reason that "in consequence of the drought last season fall-feed was very poor, and also the shortness of the corn-crop and the advanced price of grain rendered heavy feeding impracticable." Morrow, rather thin, owing to the destruction of the corn-crop by grasshoppers; Grundy, poor; "most of the farmers attempted to get their stock through on rough feed."

In sixty-one returns from Missouri, eighteen are below average and thirty-four above. Scarcity of feed is reported in Platte, Clay, Stone, Jasper, Dallas, Christian, Clinton, Montgomery, Ralls, Livingston, Vernon, Holt, De Kalb, and Jefferson.

In Kansas and Nebraska stock have suffered to some extent from scarcity of feed, partly occasioned by drought and chinch-bugs, and partly by neglect to store up, in the season of it, grass "that was abundant and might be had for the cutting." Out of thirty-three returns from Kansas, ten are below average, and sixteen above. Some of them have been noticed under "Condition of farm-animals." In Labette, cattle are poor "from shortness of pasture in the fall, scarcity of feed and the extreme length of the winter. Many skeletons scattered on our prairies." In Ottawa, the loss is greater among Texas cattle than among natives. "The past winter has clearly demonstrated that cattle cannot be success-

fully wintered, at least in this part of Kansas, without feed and shelter." In Greenwood, the report states that a considerable number have died and more must unless grass starts soon, and that the surviving are in the worst condition for several years. It adds: "The winter has been mild, but there have been frequent rain and snow storms, making the ground muddy, and as most farmers feed on the ground, much of the hay fed has been tramped in the mud and wasted." In Washington, while the condition of cattle along the streams is good, on the prairies, though grass was abundant, many have died for want of water. Our reporter remarks: "Water is a necessity which no amount of feed can supersede. I have cattle in good condition that have gone through the winter on straw and pure running water, to which they have free access." Howard, Barton, Osage, Butler, Cowley, Marion, Montgomery, Rice, and Riley are among the counties returning good condition.

Out of twenty-one returns from Nebraska, fourteen are above average. In Richardson the condition is poor, from scant fodder and poor shelter. In Cass, very poor from scarcity of corn; Nemaha, rather poor from less and poorer feed prepared last fall, and feeding sparingly of corn because of a prospect of a rise in the price; Merrick, first rate "and that without any feeding whatever;" Antelope, Hall, Stanton, Otoe, and Furnas, quite superior.

In California, the condition ranges from bad to very bad, without any reported exception, as is stated in the introduction to this report. The report from Plumas, except as to the depth of snow, will serve to illustrate the prevailing condition, though the per cent. of actual loss by death is much less than in some other counties:

Not yet out of winter-quarters, for we have still two feet of snow on the ground—a thing unparalleled at this date since the settlement of the county. The severity of the winter, and the short crops of hay last season, compelled many farmers to shorten feed before mid-winter, and hay cannot now be had at even fabulous prices. Old straw-stacks half rotten and two or three years old have, in many cases, been resorted to, also feeding grain of any description, to prevent the actual starvation of stock. So far there has been but little actual loss, and if we have mild, open weather soon, most of the stock can be saved, though considerably emaciated.

In Utah, the winter has been unusually long and severe, and consequently the prevailing condition of stock is unfavorable. In five out of ten counties reported, it is below average. In Beaver, worse than ever known; very bad in Kane, San Pete, and Iron; in the latter, a great many have died from cold and starvation. In Davis, it is poor where farmers by reason of the prolonged winter have got out of feed; but in other cases, good. New Mexico reports average condition in Mora, good in Taos and Santa Fé. In Arizona, Maricopa, cattle are fat, but in Yavapai low in condition, because herded out and exposed to all the storms of a hard, wet winter. In Colorado and the Territories east of the mountains, the winter was milder and the general condition as in the States is above average. From Montana, Missoula reports that it is excellent, and Lewis and Clarke that it was never excelled. From Dakota, Bon Homme reports the winter so mild that cattle have run on the open prairie, and done well on the old grass, and are now in extra good condition. In Davis, cattle have improved during the winter on the wild prairie-hay, "the only feed they have," and come out in first-rate condition, as they do also in Hanson.

CONDITION OF SHEEP.

As exigencies of weather and abundance or scarcity of feed affect cattle and sheep very nearly in the same degree, in the absence of any prevailing disease among either class, it may be inferred that the gen-

eral condition of sheep will correspond with that of cattle in corresponding localities. Our returns show that this is the fact. The comparatively high price of wool has had its effect in securing to sheep better protection and feed than they otherwise would have received, east of the Rocky Mountains. The general mildness of the winter, sufficiency of feed, and consequent superior condition of ewes, have conspired to raise the percentage of lambs, in number and vigor, considerably above an average. In the Southern States, the old and often reiterated complaints against the dogs, and the reasons for complaining are not in any degree abated.

In New England, among thirty-four returns, only Oxford, Maine, reports average; all others a better condition. Kent, Rhode Island, reports more lambs raised than usual.

From the Middle States, Washington, Pa., reports that those which "have been grained, as sheep should be in such winters, have done well," but the condition is not generally good for the reason that "the warm, wet winter has dulled their appetites, and, running mostly to grass, they have preferred living scantily on that rather than on hay." This is the only county, out of ninety-eight, which returns a general condition below fair or average, while eighty-two report a condition above that. In Albany, New York, farmers find it pays to feed better than formerly. Among others reporting a very high condition are Warren, Niagara, Schenectady, Rensselaer, Lewis, and Washington, New York; Warren and Gloucester, New Jersey; Snyder, York, Tioga, Bucks, Lebanon, Wyoming, and Mercer, Pennsylvania; Prince George, Carroll, Baltimore, and Wycomico, Maryland. Queen Anne, Maryland, returns good condition and no loss of lambs.

In the South Atlantic States, out of one hundred and sixty-eight returns, only three are below average—Marlborough and Georgetown, South Carolina, and Catoosa, Georgia; while one hundred and fifty are above. In Dinwiddie, Virginia, "spring-lambs very forward, and some few already marketed at $6 per head."

In Forsyth, McDuffie, Granville, and Davie, North Carolina, the condition of sheep is very superior.

In fifty-one returns from Texas, all report above, and most of them much above. Bexar, Harrison, and Medina, a condition never excelled; Navarre, Collin, McLennan, Bosque, Ellis, Hunt, and Galveston, better than for a number of years. In Austin, Bosque, and Bandera, there has been no day all winter in which green grass was not plenty; in Victoria they are fine and fat; in Williamson, have been fat all winter. In Bell and Refugio, the prevalence of scab to some extent is noted; in Austin a few deaths of lambs.

Arkansas returns two counties, Montgomery and Hempstead, as average, nineteen above and none below. From Tennessee, forty-three returns have been received; in Sumner, Meigs, Loudon, and (except those sheltered) Campbell, they are not in average condition, because not sheltered, but exposed to the prevalent damp and rainy weather. In Union, feed having given out, and in Madison and Grundy, poor condition is reported; in all others good; in Obion, they are amply rewarding for care by multiplying rapidly. "Good shelter, and good care and feeding will pay 25 per cent. in lambs, and 25 per cent. in wool."

In Coffee, our reporter says: "Sheep have done well on grass without any other feed all winter. My wethers are all in condition for the butcher, entirely on grass."

In West Virginia, among thirty-two returns, the only one not reporting a condition above average, is from Pleasants, owing to frequent rains

and scarcity of rough feed. The report from Boone states that sheep run at large in the mountains the year round, keeping perfectly healthy, and (if rightly managed) will come home for salt every eight or ten days.

In Kentucky, Edmonson reports a low condition; Boyd, poor, owing to the amount of wet weather; and La Rue, the worst ever seen, owing to the disease elsewhere noticed; seven counties return fair or average, and nineteen a higher condition; Fayette, where the grass has been green all winter, very fine; Jackson, also, in which the number of lambs living is 50 per cent. greater than average.

Eight counties in Ohio return poor condition, ascribed principally to want of shelter, wet weather, and mud, injuring both them and their feed; in Perry, good, except as affected by the disease referred to under the head of "diseases." Five counties report average, and twenty-nine above.

Michigan: three counties average, five below, and eighteen above. Macomb, 20 per cent. below; Cass, light, owing to scarcity of feed; Carroll, poor, owing to open, wet weather; Van Buren and Antrim, in first-rate condition.

In Indiana, Knox returns poor condition, resulting from a severe drought last fall; Scott, those not sheltered, poor, but good where well cared for; and Brown, the strange paradox of 10 per cent. below average, but 20 per cent. more lambs saved than usual. Nine counties report a condition about average, and twenty-five range above.

Among the returns from Illinois nine counties range somewhat below average; fourteen are designated as fair or average; and twenty-six range higher. Less favorable than last year in Boone, Winnebago, McLane, Richland, Wayne, and Mercer, owing to scarcity of grain and forage, or wet weather. The few flocks in McHenry are better than average, because "in the hands of farmers who give them the requisite attention."

Twenty-eight counties report from Wisconsin: Adams, not quite average; Washington and Dodge, not as good as last year; Clement, fair; all others better than average. Among those in which the grade of condition is the highest, are Green, Sheboygan, Crawford, Dunn, Fond du Lac, Columbia, Walworth, and Outagamie. In the latter, more than ordinary efforts to improve flocks are noted.

The general condition in Minnesota is remarkably high, only four counties, Goodhue, Isanti, Kandiyohi, and Steele being reported as low as average. In Murray, Martin, Redwood, Fillmore, Waseca, and Douglas it is first rate.

From Iowa, Monroe reports rather thin, owing to short corn-crop; Lyons, very poor; eight counties fair, or average; thirty-one range from good to never better. In the latter class are Taylor and Jasper. Marion, 12 per cent. above average. Benton, better than for several years.

Missouri reports nine counties in average condition; six below; and forty-five above. In Saint Francois the condition is bad, because cattle are not generally sheltered, and there has been a great amount of rain and sleet. In Saint Clair, where they are thin, the loss of lambs is great. Very thin in Clay, owing to scarcity of feed. In Stone, sheep are "mutton-fat, having wintered almost entirely on the growing wheat." In Vernon the wool-clip will be one-third heavier than last spring. In Holt "the mutton for sale is superior to what it usually is." In Jefferson, while the common breed is in fair condition, the merinos and cotswolds are not, they not standing exposure as well as the others.

In Kansas, sheep appear to have suffered extensively for the want of

shelter and due care. In Woodson, while flocks well cared for are in good condition, others are poor and dying of starvation. In Miami they are thin and "dilapidated" for want of shelter to them and their feed. In Bourbon, small flocks, properly cared for, are in good condition, but a flock of 400 has lost 35 per cent. from neglect and exposure. In Dickinson, all sheep that went into winter-quarters are in good condition have done well, but "most of the sheep were driven from Iowa and Missouri late in the fall, and were poor to start on; and consequently are not in good condition."

In Nebraska the general condition of sheep is considerably above average. The only county in which they are reported below is Pawnee, in which they are thin.

The condition in California and Oregon bears too close a resemblance to that of cattle already described; but, in the former State, Del Norte and San Diego report it as fine, and Plumas as somewhat better than that of cattle; and in the latter, Lane and Clatsop return good condition, and Benton average; in Douglas, except the flocks well cared for, too poor to raise lambs; in Wasco the worst for ten years; in El Dorado, California, while cattle are in very bad condition for want of proper feed, sheep are still worse, being too weak and poor to raise lambs, and consequently nearly half of the lambs have died.

Reports from Nevada state that sheep are in very fair condition, being more generally fed than cattle.

The extensive suffering and loss, from exposure and hunger, in Washington Territory, have been previously noted. King County alone reports good condition. Among the twelve counties reporting from Utah, Weber, Wasatch, and Sevier return good condition; Morgan and Iron, very good; San Pete, never better; Davis, fair, "except a few from short feed and neglect of treatment for scab;" Kane, rather poor, but better than cattle. Utah, a loss of 9 per cent. by snow-storms. From Idaho: Ada reports poor condition: Nez Perces, good. From New Mexico: Santa Fé, good; Taos, excellent; Aura, far better than last year. From Arizona: Maricopa and Mohave, good; Yavapai, great loss of sheep and all early lambs—flocks brought from California last fall and not acclimated—dying of cold; some losing as high as 70 per cent.

Returns have been received from Weld, El Paso, and Douglas, Colorado; and from Clay, Davison, Hanson, and Lincoln, Dakota, all favorable.

LOSSES OF CATTLE AND SHEEP.

Losses in cattle and sheep by death and depreciation in condition and production, the past winter, are very much less than in the previous winter, east of the Rocky Mountains, and much greater west. They do not exceed those of the winters of 1872–'73, in any county reported in New England, and in more than five-sixths they are returned either less than last year, or less than average. In Maine, Sagadahoc, never less; in New Hampshire, Carroll, less than for years; in Vermont, Addison, of cattle, 75 per cent. less; of sheep, 90 per cent. less.

In the Middle States, out of one hundred returns, seventy-four report the losses less than last year, or less than average, and not one greater. New York, Warren, 75 per cent. less; Seneca, no losses. New Jersey, Gloucester, 50 per cent. less; Hudson and Burlington, no losses, being well sheltered and fed. Pennsylvania, Bucks, Lehigh, Lycoming, Northumberland, and Greene, no losses; Mercer, 67 per cent.

less. Maryland, Queen Anne, Charles, Howard, and Washington, no losses.

In the South Atlantic States losses compared with the previous or former years are diminished in equal or greater proportion. Among one hundred and seventy-six returns, none report losses exceeding, and only fifteen equaling, those of last year, or average. Out of sixty-three returns from Virginia, in three only do the losses equal those of last year. Warwick, Sussex, New Kent, Craig, Princess Anne, Rockingham, Buckingham, Westmoreland, King George, Matthews, and Montgomery report no losses; Albermarle, less than ever before; James City, 98 per cent. less; Patrick, 90 per cent. less.

In fifty-two returns from North Carolina, five report the loss the same as last year, and forty-seven less.

Every return from South Carolina reports less except that in Georgetown more deaths among early lambs are specified.

In fifty returns from Georgia, forty-four are less, none greater. Pickens, Schley, Sumter, Murray, and Whitfield, no losses; Twiggs, 95 per cent. less.

Returns from the Gulf States are not less favorable. Columbia and Putnam, Florida, report losses the same as last year; also Lee and Jefferson, Mississippi; and Wilkinson "a greater loss in calves only." Rapides, Caddo, and Assumption, Louisiana, return average losses. All others report less than average, and so much less as to indicate that the loss in these States by death, excluding those by accidents, stealage, and dogs, can scarcely exceed 1 per cent. Franklin, Perry, Limestone, Morgan, and Tuskaloosa, Alabama; Pike, Jones, and Lowndes, Mississippi; and East Baton Rouge, Saint Landry, Saint Mary, Terrebonne, Avoyelles, and Tensas, Louisiana, report, no losses.

From Texas fifty-three returns have been received. The contrast is great between the disastrous losses of last year and the almost entire exemption from suffering and loss this. Seventeen counties report, no loss. Collin, "no loss, except by bad management in shipping fine blooded stock from Kentucky, Missouri, and Illinois;" Medina, none, (except from old age and occasional disease,) against a loss of 30 per cent. of the cattle and 15 per cent. of the sheep last year. Matagorda reports average losses—the only county that does not report less.

In Arkansas, Tennessee, and West Virginia losses have been scarcely greater. Cross is the only county in Arkansas returning losses equal to average. Craighead, Crittenden, Prairie, Pulaski, Sarcy, and Drew, no losses. Tennessee reports, from Union, losses 5 per cent. greater than last year; six counties the same, or average; thirty-eight counties less. In West Virginia, Pleasants, Grant, and Mercer report losses equal to last year; all others, less. Braxton, Brooke, and Kanawha, 75 per cent. less. Raleigh, Morgan, and Boone, 50 per cent. less. Monongalia, no losses. Marion, none, "except in some localities by black-leg."

In the valley of the Ohio, unusually wet and changeable weather, though not bringing the per cent. of loss up very near the annual average, had the effect to slightly increase it over that in the States previously noticed.

In Kentucky, La Rue reports that while the loss of cattle was no greater, that of sheep was 5 per cent. greater than last year. Russell losses 10 per cent. greater; five counties the same, or average; twenty counties less.

In forty-four reports from Ohio, nine place the losses at average, or the same as last year; in ten the losses in cattle or sheep, or both, are greater than average; in twenty-five less. Athens, losses of sheep

greater than for several years; Licking, of cattle, much less than last year; of sheep, three times as great. Shelby, of cattle, the same; of sheep, 10 per cent. greater. Morrow, of cattle 10 per cent., and of sheep 15 per cent. greater. Losses of both kinds greater in Henry, Crawford, Sandusky, and Van Wert. Hancock, no losses.

From Michigan, Carroll reports loss of cattle the same as last year; of sheep, 50 per cent. greater. Seven counties report average, or the same as last year, and nineteen less.

From Indiana: Less losses than last year are reported in thirty counties; Huntington, Hamilton, La Porte, and Orange, no losses; in eight counties the same as last year, or average; Scott, the same in cattle, 5 per cent. greater in sheep; Starke, 2 per cent. greater.

In Illinois thirty-two out of fifty counties report losses less than last year, and nine the same, or average; Boone, no greater in cattle, but 25 per cent. greater in sheep; Richland, 20 per cent. greater than for five years; McLean, 4 per cent. greater; Tazewell, 10 per cent.; Macon, Mercer, and Vermilion, somewhat greater.

In Wisconsin losses are less than last year in twenty-five out of twenty-nine counties reported. Washington, Green, Waukesha, Douglas, and Outagamie, no losses; Dodge and Dunn, very few; Iowa less than for ten years. The only counties reporting greater are Ozaukee, 30 per cent., and Adams, 3 per cent. greater in sheep.

From Minnesota the reports are almost uniformly favorable; the only exceptions being Redwood, greater loss than last year from disease, and less from freezing to death; and Kandiyohi, no loss in cattle; in sheep, 5 per cent. greater.

Reports are equally favorable from Iowa; forty out of forty-seven, indicating, on the average, a largely diminished loss from last year. Woodbury, Louisa, Allamakee, Appanoose, Webster, Dallas, Montgomery, Plymouth, Scott, Sioux, and Harrison, no losses; Clayton, scarcely any; Shelby, the same as last year in cattle, 10 per cent. greater in sheep, being the only county in which a greater loss of either is returned.

In Missouri the losses, though small compared with previous years, have been considerably larger than in either of the other States bordering the Mississippi on the west. In forty-four of the sixty-one counties reported, they are either less than the previous year, or less than average. Moniteau, less than ever before; McDonald and Platte, no losses; Ralls, same as last year in sheep, in cattle 37 per cent. greater; Montgomery and Dade, 10 per cent. greater; Maries, in sheep, 200 per cent. greater; De Kalb, in sheep, average; in cattle, 500 per cent. greater.

In Kansas the proportion of losses compared with the last year, especially in cattle, is greater than in any other State east of the Pacific slope. The principal causes assigned are a long, wet, changeable winter and want of adequate shelter and feed. In Osage, losses in cattle greater than for several years; Jefferson, greater than average, 20 per cent.; Nemaha, nearly double; Greenwood, 67 per cent. greater. In cattle and sheep, Miami, 10 per cent. greater; Labette, 20 per cent.; Bourbon, 50 per cent.; Washington, in cattle, one-half; in sheep, one-eighth; Sedgwick, 75 per cent. less; Cowley, 98 per cent.; Douglas, no losses; Montgomery; very few; Dickinson, no loss in cattle.

From Nebraska the returns are more favorable, being up to the general average of very slight losses east of the Rocky Mountain Range. In eighteen returns two report the losses the same as last year; all others less.

The losses on the Pacific slope have already been sufficiently noted

under the head of "farm animals," except in the Territory of Utah, where they have been about average with previous years in sheep, but greater in cattle. Davis reports losses of cattle greater than last year; of sheep less. Beaver, of cattle, 300 per cent. greater; of sheep, never less. Weber, of cattle, greater; of sheep, no losses. San Pete, of cattle, 33 per cent. greater; "farmers are considering the best plan to increase feed and avoid future losses."

Returns from the several Territories east of the mountains, generally indicate that both cattle and sheep have come through the winter with very slight losses.

In nine hundred and fifty-nine returns from the Atlantic slope, one hundred and twenty-seven report the losss in cattle and sheep either equal to those of last year or average; seven hundred and eighty-six as less; and only forty-six as greater. In forty-seven from the Pacific slope, thirty-seven report greater losses, and eight less.

DISEASES OF FARM ANIMALS.

The sanitary condition of farm animals during the past year has been quite as favorable as in any period since the inauguration of these reports. The difference is mainly due to the mildness of the past winter, together with the absence of long-continued seasons of drought and excessive heat in summer. Gradually the profitableness of better treatment of domestic animals is dawning upon the minds of the more improvident owners, though such education is slow and dearly bought. There are yet, however, some exceptions to this general improvement. These are found only in a few unprogressive localities in the South and West, where old wasteful methods still prevail. An Oregon correspondent sharply criticises the practice of farmers of his country in turning animals out to shift for themselves, trusting to a mild winter and early spring rains to start the grass, expectations which are very frequently disappointed. Several similar cases are reported in other parts of the country. It is remarkable that specific diseases are most prevalent in such localities. Below will be found a brief generalization of the diseases affecting different classes of farm animals.

DISEASES OF HORSES.

Leaving out of view the relapses and effects of the great visitation of epizootic-influenza, the record of horse-diseases in 1873 would be quite unimportant. Diseases reported are of a milder type than usual. The fatalities noted are mainly the results of neglect and improper treatment, either in health or after symptoms of disease have been developed. Yet in this respect there is a growing improvement. Men are discovering that the dictates of mercy coincide with those of an enlightened self-interest. Public sentiment is also awakening to a closer scrutiny of the treatment of the useful animals, thus largely counteracting the temptations to thoughtless cruelty, which have too often disgraced our civilization. There can be little doubt that a proper treatment of horses would diminish their liability to disease, and consequently depress the rate of mortality, thus effecting a great saving to the industrial interests of the country. New Hampshire, Massachusetts, Rhode Island, and Louisiana report no prevailing maladies. The leading types of disease reported in the other States will be found in the following *résumé.*

EPIZOOTIC INFLUENZA.—This epizootic broke out about the last of the summer of 1872, and traveled across the country in a general south-

westerly direction. Certain portions of the country did not receive this contagion until during the first months of 1873. Some of our reports embrace the first experiences of the malady, while others chronicle its secondary visitations or its chronic results. It is not always easy to distinguish which of these is intended. In the New England States a few counties experienced for some months the injurious effects of the disease, but generally the horses of these States were in a healthy condition. In York, Maine, stabled horses that had suffered from the first attack, had swellings in their legs during 1873, but farm-horses generally escaped. In Piscataquis, the disease was confined to horses employed in lumbering. Mild visitations are reported in Oxford, Maine; Caledonia and Rutland, Vermont; Tolland and New London, Connecticut. Few deaths are noted. The Middle and Atlantic coast States present nearly the same general indications. In New York, Albany, Livingston, Warren, Niagara, Saratoga, and Seneca Counties report a limited extent and mild type of disease, as also do Sussex, Hudson, and Cape May, New Jersey. In Camden, New Jersey, there was a disease, probably a modification of this influenza, which considerably resembled colt strangles, but it affected old horses also. The presence of the disease, or of some of its chronic effects, was noted in Washington, Center, Clearfield, Clinton, Chester, Berks, Armstrong, Wyoming, Somerset, and Dauphin, Pennsylvania; in Sussex, Delaware; in Wicomico and Queen Anne, Maryland; and in Rappahannock, Sussex, King William, Russell, Page, Highland, Patrick, Scott, Albemarle, and Powhatan, Virginia. In some cases only over-worked and ill-treated horses were diseased. In other cases horses in good condition, that had escaped the first visitation of the disease, were affected by its reactionary influences. In North Carolina, Lincoln, Pasquotank, Wake, Dare, Caswell, Henderson, Stokes, Ashe, Jones, Iredell, and Buncombe report a partial prevalence, with inconsiderable losses, as also Georgetown and Richland, South Carolina; and Laurens, Pickens, Gilmer, Dawson, Johnson, Liberty, Early, Coweta, Walker, and Jefferson, Georgia.

In Florida, Jackson, Columbia, Gadsden, Wakulla, and Orange report mild visitations; as also do Smith and Tuscaloosa, Alabama; Lee and Coffee, Mississippi; Palo Pinto, Colorado; Red River, Victoria, Burnet, Washington, Galveston, Polk, and Uvalde, Texas; Searcy, Columbia, and Woodruff, Arkansas; Lincoln, Humphreys, Hancock, Wilson, Johnson, Williamson, and De Kalb, Tennessee; Barbour and Preston, West Virginia; Clarke, La Rue, Trimble, Hart, Jackson, and Mead, Kentucky. In some counties the secondary attack degenerated into glanders, in all cases fatal.

The infliction was light in the few counties north of the Ohio River in which it was reported, viz, Adams, Mercer, Vinton, Ross, and Perry, Ohio; Van Buren, Michigan; Dubois, La Porte, Martin, Union, and Scott, Indiana; Boone, Bureau, Carroll, Madison, Franklin, Clinton, Piatt, McHenry, DeWitt and Knox, Illinois; Saint Croix, Washington, Dane, La Crosse, Ontonagon, Eau Clair, Dunn, Crawford, Buffalo, and Columbia, Wisconsin. In some cases the disease showed a decided tendency to dropsy. West of the Mississippi it was marked by the same limited range and mildness of type, being frequently styled the dregs of the former visitation. The severe demands upon horses in the labors of agriculture in some localities have somewhat aggravated the symptoms. The presence of the disease is noted in Dodge, Blue Earth, Benton, Martin, McLeod, Stearns, Faribault, Steele, and Waseca, Minnesota; Woodbury, Black Hawk, Humboldt, Pocahontas, Lee, Jefferson, Mower, Muscatine, Decatur, Marion, Marshall,

and Hancock, Iowa; Chariton, Maries, Jefferson, Washington, Montgomery, Benton, Christian, Pettis, Cass, and Franklin, Missouri; Marshall, Howard, Miami, Johnson, and Cherokee, Kansas; Richardson, Nebraska. On the Pacific coast some of the reports indicate the results of the first visitation of the disease, which was not developed until 1873. Sonoma County, California, reports a loss of 5 per cent.; stabled horses, especially livery-horses, were the most severely affected. The disease is also noted in Del Norte, Lake, Stanislaus, El Dorado, Mendocino, and Contra Costa, California; in Polk, Lane, Yamhill, and Grant, Oregon; in Esmeralda, Nevada. In the Territories the presence of the disease is noted only in Walla-Walla and King Counties, Washington; Weber and San Pete, Utah; and Maricopa, Arizona.

DISTEMPER.—The range and intensity of this malady were quite limited. It is mentioned in three counties in New England, viz, Somerset, Maine; and in Franklin and Grand Isle, Vermont. It was noted in Franklin, Northampton, and Adams, Pennsylvania; in Baltimore and Frederick, Maryland; in Madison, King George, Smyth, Russell, and Scott, Virginia; in Yancey, McDowell, Alamance, Watauga, Greenville, Davidson, and Warren, North Carolina; in Fannin and Towns, Georgia; in Williamson, Texas; in Woodruff, Arkansas; in Grundy, Johnson, Maury, Meigs, and Robertson, Tennessee; in Jefferson, Tucker, Grant, and Harrison, West Virginia; in Trimble, Lewis, Laurel, Russell, Livingston, and Metcalf, Kentucky; in Huron, Perry, and Jackson, Ohio; in Orange, Indiana; in Richland, Wisconsin; in Chariton, Osage, and Lincoln, Missouri; in Brown and Cloud, Kansas. The only visitations at all severe were in Jefferson, West Virginia, where the cases were of a malignant type; in Russell, Kentucky, where the deaths amounted to nearly two per cent., and in Metcalf, Kentucky, where half of those not stabled and treated died. In some cases it is called colt distemper, from the fact that only colts were affected with it.

BLIND STAGGERS.—Several of our correspondents attribute this disease entirely to feeding damaged grain. The disease was found only in the corn-growing regions of the South and Southwest, a few only being found in Southern Kansas. Our correspondent in Kerr, Texas, says that the corn in that region was infested, during its milky stage, by a sort of caterpillar, leaving a very noxious dust or powder in the husk. Grain being fed generally without winnowing, much of this poison was absorbed by the horses feeding upon the damaged corn. In the disease as here developed a sack of pus was formed within the head, just below the line of the eyes. In many cases instant relief was given by passing a sharp instrument or stick up the nostril and tapping the sac, which instantly discharged its noxious contents. Another effective remedy was to bathe the space between the ears with spirits of turpentine, and rub freely with a hot smoothing-iron. This disease was quite destructive in Williamsburgh, South Carolina. It was noted in Taylor, Florida, and in Lauderdale and Smith, Alabama; in the last-named the deaths amounted to three per cent. of the cases. It occurred in Newton and Lauderdale, Mississippi; in Palo Pinto, Blanco, Gillespie, Bandera, San Saba, and Upshur, Texas; in the last-named the loss amounted to one per cent. It was also troublesome in Independence, Sharp, and Hempfield, Arkansas; in Fayette and Johnson, Tennessee; in Greenwood, Rice, and Barton, Kansas.

COLIC.—This disease is attributed to poor feed and exposure in Lawrence and Dauphin, Pennsylvania. In Williamsburg, South Carolina, it destroyed half the mules brought from the West in 1872 and 1873. It was noted in Lauderdale, Alabama, and was severe in Cross,

Arkansas. In Bradley, Tennessee, and in Taney and Stone, Missouri, it prevailed to some extent, associated with bots.

LUNG-FEVER.—A few cases were reported, all north of Mason and Dixon's line—from Aroostook, Maine; Chautauqua, New York; Westmoreland, Northampton, and Franklin, Pennsylvania; Richland, Ohio; and Benton, Iowa.

CEREBRO-SPINAL-MENINGITIS.—A few cases were noted in Hartford, Connecticut, and in Scott, Iowa. The street-railway horses in Brooklyn were also affected with spinal disease to a serious extent.

PLEURO-PNEUMONIA.—Some fatal cases occurred among well-sheltered and well-fed horses in Montgomery, Pennsylvania. It was accompanied by sore mouth and throat in Saint Mary, Maryland. A few cases, but no deaths, occurred in Otoe, Nebraska.

INFLAMMATION OF THE KIDNEYS.—In Northampton, Pennsylvania, horses, in apparent good health, would suddenly fall helpless. Ulcers would break out upon the hips and run for months, leaving the animal very lame. It was a question whether such horses should not be immediately put out of their misery by shooting.

MISCELLANEOUS. — In Smyth, Virginia, what is called foot-ail is noted. In Madison, Nebraska, cracked-hoof and bound-hoof resulted from lack of care. Brain-fever, with some fatality, is reported in McDuffie, Georgia; catarrhal fever in Marion, Indiana. Farcy was noted in Antelope, Nebraska. In Vernon, Missouri, 100 horses died of yellow-water. Several deaths resulted from dysentery in Bureau, Illinois. The sweeny and big-shoulder are mentioned in Marion, Mississippi. Horses from the East do not thrive in the elevated atmosphere of Boone, Nebraska. In Levy, Florida, horses and other stock swallow very considerable quantities of sand. When the grass starts in the spring sufficiently to constitute an aperient, horses and mules pass nothing but white sand for two or three days at a time. What is called heart-dropsy killed several good horses in Hancock, Iowa. The symptoms showed great variety, except in the one point of a great and abnormal agitation of the heart. In Lawrence, Missouri, horses were affected with swellings in the legs, which caused great emaciation. In Woodson, Kansas, a malady, supposed to result from epizootic influenza, causes animals to gradually decline in flesh and strength till they die, with little pain. In Labette, Kansas, a similar disease affected only animals from the East and North.

DISEASE OF CATTLE.

Only one county in New England reported any cattle-disease, and that but a limited and local one affecting calves. The Middle States present only a few casualties from abortion, and a few cases of pleuro-pneumonia and distemper. In the South a class of diseases indicated by the unmeaning term murrain are heard of in a few counties, with numerous cases of black-tongue, distemper, &c. Of Western States, Kentucky, Ohio, Wisconsin, and Oregon, present an entire exemption from prevailing diseases. In the other States the greatest loss was experienced from the Spanish or Texas fever, resulting from the importation of Texas and Cherokee cattle. The following is a brief generalization of cattle-diseases affecting different parts of the country in 1873:

TEXAS FEVER.—This fever was more or less destructive in the range of States from Indiana to Kansas. In Fountain, Indiana, twenty deaths followed the contact of natives with Texans. The southern part of Sangamon, Illinois, was visited during the summer, and hundreds died, occa-

sioning great alarm in the community. A large percentage of cases was among "Missouri cattle" which had passed through the Saint Louis stock-yards. In some cases they escaped themselves though they imparted the disease to native cattle. Cattle known to be Texas cattle were not affected themselves. Several hundred deaths are reported in Macoupin.

In Missouri several counties report considerable fatality from the presence of Texas cattle. Nodaway lost two hundred; Caldwell, over one hundred in a few herds in the town of Kidder. Jasper, Pettis, Stone, Saint Clair, and Vernon report numerous cases, as also Howard County, Kansas.

MURRAIN.—This name, with its variations, bloody murrain and dry murrain, is used to describe a variety of diseases. In no county was the loss at all remarkable except in Bibb, Alabama, where between fifty and one hundred deaths are reported. In Floyd, Virginia, a few cases were noted; the attack was sudden and fatal in from three to five hours; no effective remedy is mentioned. A few cases of murrain, in some form, occurred in Sullivan County, New York; in Grayson, Patrick, Scott, Powhatan, Gloucester, and Monroe, Virginia; in Caswell, North Carolina; in Lauderdale, Alabama; in Tensas, Louisiana; and in Independence and Washington, Arkansas. In Grant, West Virginia, the disease was less prevalent than formerly.

BLACK-LEG.—This disease, reported mostly in the northwest, made quite a havoc in Marion, West Virginia, on some farms destroying all the calves, and causing farmers to quit raising them. In Grant and Pendleton some isolated cases are noted. A few cases, mostly fatal, curred in Stark, Indiana. The disease appeared also in Grundy, Illinois; Jackson, Minnesota; Benton, Hardin, and Shelby, Iowa; Vernon, Missouri; Osage, Howard, Nemaha, and Woodson, Kansas. In the last-named county one neighborhood lost 60 per cent. of the calves. This is attributed to custom of allowing animals to stand or lie in mud and water.

PLEURO-PNEUMONIA.—In Hudson, New Jersey, a few cases were developed among cattle sold by cattle-peddlers at suspiciously cheap rates. These animals were found to be swill-fed stock from the stables of New York and Brooklyn. By persevering efforts the disease was eradicated. A few cases are reported in Chester, Pennsylvania. In Baltimore, Maryland, the disease after having been with difficulty suppressed broke out again, but with diminished virulence.

DISTEMPER.—This disease was manifested in a few cases in Kings, New York; Lunenburgh, Virginia; Henderson, Stanly, Wilkes, and Caldwell, North Carolina; it was quite fatal in some parts of Pickens, Georgia.

ABORTION.—This disease was noted in Montgomery, New York, where 4 per cent. of the calves were lost. A few cases occurred also in Sussex, New Jersey, and Nemaha, Kansas, mostly among young cows. This disease is known to be quite prevalent in dairy districts, but its existence is kept as private as possible.

MILK-FEVER.—In Troup, Georgia, milk-fever prevailed to a considerable extent, coming on from one to three weeks after calving; symptoms: loss of appetite, dullness, rolling of the eyes, looking at the flanks, paralysis of hind-quarters, trembling as if from chill, &c. Several cases were cured by doses of half a pound of Epsom salt dissolved in a quart of boiling water and mixed with a pint of molasses, administered as warm as possible. In every case this remedy gave immediate relief. Some cases were noted in Saint Joseph, Michigan.

HOLLOW HORN.—Several of our correspondents consider this term as the synonym of hollow stomach. In all cases it resulted from poor feeding and neglect. Stafford and Surry, Virginia; Madison, North Carolina; and Dallas, Arkansas, report a few cases.

MAD ITCH.—This disease was mentioned in the reports from Mercer, Illinois, and Nemaha, Nebraska.

SORE TONGUE.—A few died of this malady in Georgetown, South Carolina, and in Richland, Illinois; probably death was caused by starvation from inability to eat. In Sullivan, Tennessee, all affected recovered in six or eight days. The *black tongue* is reported in North Georgia.

DIARRHEA.—In Russell, Kentucky, some cattle were affected with copious discharges, watery, tar-black, and exceedingly offensive; they fed greedily but fell off rapidly, becoming so weak as to be unable to stand; they died of exhaustion and apparently without pain. A few cases of diarrhea are reported in Wilkinson, Mississippi.

MISCELLANEOUS.—In Wilkinson, Mississippi, a few calves died of a swelling of the sub-maxillary and parotid glands. In Assumption, Louisiana, cattle became weak and emaciated, lumps about the size of an egg forming along the back. These, on being opened, were found to be filled with worms precisely of the form and size of bot-worms in horses. In Putnam, Illinois, stock were affected with eye-diseases; no fatalities. In Washington, Kansas, cattle died so suddenly as to give suspicion of poisoning. A post-mortem examination showed inflammation and gangrene in the stomach and worms filling the intestinal canal. Some attributed this result to drinking stagnant water in the holes of the dry prairie. A case of gross abuse and cruelty is reported in Ralls, Missouri. A large herd, principally the refuse of the Saint Louis market, were grazed on the prairie and herded at night in small inclosures. At midsummer, when water was scarce and the animals had no supply except from filthy pools, a disease broke out and one hundred died. In Miami, Kansas, small feeders met with considerable losses through neglect, exposure, and poor feeding. In Del Norte, California, some calves died, it is supposed, of leeches in the liver.

Several new diseases, as yet unnamed, were reported in different parts of the country. In Caledonia, Vermont, calves about four months old became stupid, refusing to eat and died in convulsions in from twelve to sixteen hours. Many farmers lost half their calves. In Washington, Kansas, an affection of the lungs, accompanied by weak eyes discharging matter, was somewhat troublesome. In Redwood, Minnesota, many young cattle died of an unknown disease; they were usually taken with stiffness, loss of appetite; would lie down, never to rise again; the hind parts became paralyzed; death supervened in from twenty-four to forty-eight hours, sometimes accompanied with severe pains and sometimes not; the blood then congested in dark blotches; the animals affected were mostly in good condition. Older cattle, in Osage, Kansas, exhibited a strange malady. They would stand stupidly, refusing to eat and then lie down and die. It was mostly the best cattle that were thus affected. In Nemaha, Kansas, in herds kept during the summer in close range and fed on prairie-hay, many cattle apparently in good condition previously were found dead without any apparent disease. In Butler, Kansas, many Texas cows, heavy with calf, died suddenly of an unknown disease. In Riley County, Kansas, close herding, cruelty, and starvation have brought in new types of disease for which, as yet, no popular name has been found. In Wasco, Oregon, during twenty years, there was a foot-disease resulting in the entire

loss of the hoof. It was not very prevalent, however, and disappeared with the return of spring.

In Burke, North Carolina, about 5 per cent. died of a fever that has infested the county for ten years. In Wilkes, Georgia, a few cases of fever were successfully treated with sulphur and sulphate of iron. In Clinton, Illinois, one hundred and twenty-five cattle died with high fever and acute pain. The maw, on dissection, appeared to be hard, dry, and about two-thirds full of mud. The animals had fed upon the dry prairie and had drunk of the muddy waters of its stagnant pools.

The Territories present a remarkable exemption from disease; not a county reports anything like a prevalent type.

DISEASES OF SHEEP.

In New England, New Jersey, Delaware, Maryland, North Carolina, South Carolina, Florida, Alabama, Mississippi, West Virginia, Michigan, Wisconsin, Minnesota, and Nebraska sheep-diseases have been too inconsiderable to deserve mention. In the other States the staple complaint is of liver-rot, foot-rot and scab, with an occasional case of grub in the head. In various portions of the Middle, Southern, and Western States, the chronic grievance of "worthless curs" is aggravated by increased ravages. In some counties sheep-husbandry is entirely prostrated. Our correspondent in Seneca, New York, puts the case strongly and pathetically in describing the loss of choice merinos by one of his assistants. He says, "None but those who have spent long years and money without stint in bringing to perfection a thorough-bred flock can appreciate the loss and discouragement."

The following is a brief abstract of reports, showing a gratifying exemption from disease as compared with former years:

Foot-rot.—In Yates, New York, foot-rot affects about one-fourth of the flocks, receiving sufficient attention to prevent its spreading, but not to secure its final extirpation. It was also noted in Steuben, but was under better control than formerly. It was mentioned in but three counties of Pennsylvania, Washington, Mercer, and Warren. In the last-named, coarse-wooled sheep, less liable to this disease, are raised in increasing numbers. The most approved remedy here is pure hydrochloric acid. It was noted also in Prince George, Virginia; Fannin and Gordon, Georgia; Jackson, Kentucky; Logan, Huron, Hancock, Wyandot, Crawford, and Delaware, Ohio; White, Indiana; Lee and McHenry, Illinois; Jackson and Buchanan, Iowa; Sumner, Kansas. In nearly all these localities the infliction was light and the loss inconsiderable.

Rot.—This disease prevailed to a considerable extent in Stafford and Scott, Virginia; in the last-named county the loss was 10 per cent. Murray, Georgia, also lost 10 per cent., and Dooly acknowledged the presence of the malady. In Cameron, Louisiana, it swept half of some flocks. Five per cent. of the sheep of Humphreys, Tennessee, were affected. In Blount 4 per cent., and in Putnam, 6 per cent. died. In Meigs, a third of the old sheep were lost. In Butler, Kentucky, the loss was 4 per cent.; in Pulaski, 10 to 15 per cent.; in Russell, 10 per cent.

Scab.—A few cases are reported in Washington, New York, and in Bucks and Lawrence, Pennsylvania; mostly in poorly-attended flocks. An effective remedy was found in a solution of carbolic acid in 300 parts of water. Some scab was brought into Prince William, Virginia, by flocks from the Southwest. In Caddo, Louisiana, 25 per cent. of the sheep were affected. This malady was more general in Texas, causing

a movement of many flocks from several counties to the Rio Grande, where the sanitary conditions are said to be much better. Scab exists in Bell, Navarro, Bee, Collin, San Saba, Williamson, Austin, DeWitt, Uvalde, and Medina. In most of these counties the malady was of a very mild type. Bathing infected animals in a strong decoction of tobacco is highly recommended as a remedy. Fountain, Indiana, and Boone, Madison, Vermillion, Clinton, and Schuyler, Illinois, report a slight degree of scab, but not in well-tended flocks. The tobacco decoction was, in several localities, used with success. One flock of 300 in Schuyler was entirely freed by this remedy. In Iowa, Decatur reports one-fourth of the sheep scabbed; Marion, 10 per cent. In Clinton, Missouri, 50 per cent. were affected; in Montgomery, 5 per cent. The disease was also noted in Pike, Washington, Putnam, Vernon, Clay, and Lincoln. Brown, Kansas, never had a case, although just across the Missouri River the disease is rife. In Lincoln, an overdriven and abused flock from Missouri lost one-half. Woodson lost 8 per cent. of her fine-wooled sheep; coarse-wooled not being affected. It was quite severe also in Sumner. In Plumas, California, it caused a large loss of wool, and a loss of 5 per cent. of the sheep. It is noted in Del Norte, San Diego, Stanislaus, Amador, Contra Costa, and Sonoma. In many instances it was the direct result of insufficient feeding and neglect. It also appeared in Wasco and Lane, Oregon. Several counties in the Territories report the presence of scab, viz: Mora, New Mexico; El Paso, Colorado; Morgan, and Rich, Dakota; Salt Lake and Davis, Utah; King and Walla Walla, Washington. In some of these counties the disease is very limited, in others it embraces half the flocks. A mixture of quicksilver, lard, and tar is recommended, as well as a preparation of tobacco, arsenic, and tar. Both these remedies were found effective in Davis, Utah.

MISCELLANEOUS.—A few sheep, apparently in fine condition, in Northumberland, Virginia, unaccountably refused to eat, and died of apparent starvation. The blind-staggers is reported in King William and Nelson, Virginia, in the former the loss amounted to 1 per cent., in the latter, the disease was attributed to eating ivy. With proper attention, and copious doses of thin gruel, they recovered entirely in ten or twelve days. It is also noted in Sumner, Tennessee. Orange, Indiana, lost 1 per cent. from pneumonia. Wayne, Illinois, chronicles a mortality of 10 per cent. from a dry, hacking cough. In Bee, and DeWitt, Texas, many lambs died of worms. The scours in La Rue, Kentucky, was caused by salting sheep with salt that had been used on meat. Grub in the head was quite destructive in Washington, New York; one flock of two hundred and fifty, losing sixty. Medina, Ohio, lost 8 per cent. from the same disease, which was also reported in Huron, and in Coffee, Tennessee. Carroll, Ohio, lost lightly from paper-skin. Jefferson, Missouri, lost 12 per cent. of her fine sheep from a disease called "running-at-the-nose." Multnomah, Oregon, lost 3 per cent. from flukes in the liver. In Clatsop, this disease was developed on new lowlands, while sandy coast soils were entirely exempt. The loss in the whole county was between 5 and 6 per cent. In some cases the open winter had caused a considerable falling of wool from the sheep.

DISEASES OF SWINE.

Swine were remarkably healthy during 1873. New England, New York, New Jersey, Delaware, Michigan, Wisconsin, and Minnesota were entirely exempt from prevailing diseases. With the exception of considerable loss from black-tooth in Bonhomme, Dakota, all the Terri-

tories may be placed in the same category. Several States report a little disease of some kind in one or two counties. In the other States the number of counties mentioning hog-diseases bears a small proportion to the whole, and the maladies are generally of a mild type and limited range. Some localities, especially in the South, were subjected to severe losses, but no general epizootic malady is indicated in any of the States. The popular nomenclature is still very loose, frequently designating by a single name, cholera for instance, maladies of specifically different type. Hence the following abstract of our reports can make no pretensions to scientific accuracy.

CHOLERA.—A few cases of what is called cholera are noted in Dauphin and Westmoreland Counties, Pennsylvania, and in Washington, Baltimore, Wicomico, Saint Mary's, and Montgomery, Maryland. In the last-named county the symptoms were those of a malignant fever, producing constipation, general debility, and stiffness of the legs. In one locality one-fourth of the hogs died, and the residue were left in a feeble condition. In Virginia the disease assumed a more malignant character. Scott County reports a loss of 50 per cent. from cholera and quinsy; Rappahannock, from one-third to one-half, some farmers losing their whole stock; Page, 50 per cent., no effective remedy being found; Floyd, 40 per cent. in some localities, in others none at all; Russell, one-eighth; Montgomery, 8 per cent.; Patrick, 10 per cent.; Clarke, 12 per cent., in the northeastern part; Fairfax, 5 per cent.; Washington, 300 head; Madison, Pulaski, Frederick, Gloucester, Lunenburgh, Surry, Smyth, and Warren, some losses. In the last-named county a pint of apple-brandy, administered in two doses, was found effective. Our correspondent in Highland suggests that cholera generally follows a heavy mast year; hogs, in the following year, being scantily fed, are more liable to destructive diseases.

In North Carolina heavy losses were fewer. Polk lost one-third; Guilford and Stanly one-fourth; Wake, one-fifth. Here the disease was, by some, called typhus fever; it yielded to no remedies. Gaston lost 12 per cent. from cholera and quinsy; Rockingham, 10 per cent.; Buncombe, 5 per cent.; Greene, 150 head; Yancey and Granville, 3 per cent. in some localities; smaller losses in Lincoln, Mecklenburgh, McDowell, Madison, Franklin, Caswell, Henderson, Stokes, Davidson, Randolph, Caldwell, Ashe, Martin, Harnett, and Warren. In Alamance some hogs died from eating mushrooms, and their death was attributed to cholera. A mixture of lard, castor-oil, and kerosene were found effective in some cases. In Stanly, where the loss was estimated at 25 per cent. of the whole stock, the disease was characterized by a bloody diarrhea; the causes assigned were exposure and lack of food. Small losses were experienced in Clarendon and Williamsburgh, South Carolina. In Georgia losses were not generally severe. Early lost one-third; Gilmer, 5 per cent.; in Worth, in some districts, nearly all died; Upson, 2½ per cent.; McDuffie, Marion, Coweta, Lee, and Hancock, a smaller percentage. In Lee the disease attacked first pigs and then older hogs, usually sweeping all on the plantation. In advanced stages the animal broke out into eruptions all over the body. In Florida it is mentioned only in Madison. In Alabama, Coffee lost 50 per cent.; Perry, 25 per cent.; Greene, 15 per cent.; Lauderdale, 5 per cent.; Russell, 4 per cent.; smaller losses in Saint Clair, Crenshaw, Wilkinson, and Tuscaloosa. In Mississippi, Yalabusha lost one-third; in some parts of La Fayette three-fourths died of cholera and red mange; Lauderdale lost 5 per cent.; in some parts of Grenada whole herds were swept. Bossier is the only parish of Louisiana reporting cholera

or any other disease. In Texas, Fannin reports a loss of 75 per cent.; some herds being entirely exterminated. In Lamar the visitation was alarming, in some localities destroying the last hog. The disease appeared to come from the South through the center, the east and west portions of the county being mostly exempt. Only a few of the other counties, Red River, Cherokee, San Saba, Victoria, Atascosa, report the disease, and generally in a mild form. In Arkansas, Randolph lost 25 per cent. from cholera and quinsy; Montgomery, 5 per cent.; Campbell, 3 per cent.; Cross, Smith, and Woodruff, smaller percentages. In Craighead some deaths from eating acorns were attributed to cholera, in order to cover the neglect of providing them better food. In Cross, the disease is also called red-bone. Heavy losses are reported in several counties of Tennessee. Morgan and Madison, 33 per cent.; Obion, 25 per cent., being always heavier after a copious beech and oak mast; those who fed and took care of their hogs saved them; Williamson, 22 per cent., some herds losing half; Linden, Jefferson, and Robertson, 20 per cent.; Decatur and Roane, 10 per cent.; smaller losses in Washington, Hardin, Humphreys, Loudon, Fayette, Maury, Sumner, Carter, Greene, Hancock, Putnam, Johnson, Weakley, and De Kulb. In Sumner, the disease is also styled pneumonia. In Knox, a loss estimated at 20 or 30 per cent., resulting from gathering large numbers at fattening time; the symptoms subsequently disappeared. A post-mortem examination in Hancock showed a high inflammation of the kidneys, the adjacent parts presenting the appearence of bruised flesh. The best remedy here was the administration of a gallon of spirits of turpentine to each 100 hogs once in two weeks. In Jefferson, West Virginia, from 2,500 to 3,000 hogs died, valued at $10,000; Lincoln lost 30 per cent.; Morgan, 15 per cent., the disease here being called blue sickness; Berkeley and Cabell, minor losses. In Kentucky, Shelby lost 2,000 head; Breckenridge, 50 per cent. in the eastern sections, and 12½ per cent. of the whole; Mercer, 40 per cent.; Christian, 33 per cent.; Hopkins, from one-third to one-half; Graves, 25 per cent.; Pulaski and Nelson, 20 per cent.; Warren, 10 per cent.; Boyle, 12½ per cent. of young hogs; smaller losses in Trimble, Laurel, Russell, Jefferson, Spencer, La Rue, Hart, Livingston, Jackson, and Boone. In Ohio, the heaviest loss, 10 per cent., was in Ross and Warren. In Huron the mortality was mostly among distillery hogs; one establishment lost 700 in three weeks. In Hamilton, on the bottoms and river courses, the deaths amounted to 10 per cent. The disease existed in Van Wert, Fairfield, Mercer, Vinton and Shelby. In Indiana, Johnson lost nearly half; Marion and Pike, 25 per cent., mostly among young hogs; Martin, 20 per cent. in some neighborhoods. The disease was here called pleuro-pneumonia; Tipton, 15 per cent.; Hamilton, 10 to 15 per cent.; Morgan and Decatur, 10 per cent.; smaller losses in Ohio, Brown, Knox, Clay, Warren, Fountain, Spencer, and Jennings. In Illinois, Wayne and White lost 30 per cent.; Bureau, between 1,000 and 2,000 head from cholera and quinsy; Edwards, 20 per cent.; Stark, McLean, and Franklin, 10 per cent.; Washington, Cass, and Mason, 5 per cent. The disease was noted in Sangamon, De Witt, Macon, Macoupin, Henderson, Carroll, Tazewell, Rock Island, Madison, Marion, Warren, Vermillion, Putnam, Clinton, Williamson, Richland, Mercer, and Lee. In Macon, a tablespoonful of turpentine and a gill of dish-water was found a very effective remedy. In De Witt animals that recovered from the disease did not subsequently thrive; the pigs they brought forth were either born dead or soon died. In Ringgold, Iowa, 20 per cent. died; Benton, 10 per cent.; Wayne, 10 per cent. in some localities; Dallas, 8 per cent.; Appanoose, 6 per cent.; smaller losses in

Louisa, Jones, Johnson, Hardin, Jones, Greene, Decatur, Marion, Jackson, and Harrison. Missouri reports a loss of nearly 50 per cent. in Pike, and 30 per cent. in Caldwell, from cholera and associated diseases; Bollinger, 15 per cent.; Maries and Carroll, 10 per cent.; Worth, Bates, Nodaway, Ralls, Stoddard, 5 per cent.; minor losses in Texas, Polk, Holt, Benton, and Lincoln. Jefferson lost 40 per cent. in one district from eating a copious black-oak mast; death supervened in forty-eight hours; drenching with coal-oil was found beneficial. In Richardson, Nebraska, the disease was destructive on the Missouri bottoms, some farmers losing all; Nemaha lost 12 per cent.

THUMPS.—This disease is frequently mentioned in connection with cholera, and very propably has often been confounded with it. It is reported in Laurens, Georgia, and in Madison, Suwannee, Columbia, and Pilatka, Florida. In the last-named county, in connection with the staggers, it carried off 25 per cent. It is also noticed in Wells, Indiana; Ralls, Missouri; and in Polk, Oregon.

QUINSY.—This disease was noted in Coahoma, Mississippi; Randolph, Arkansas; Putnam, Tennessee; Clinton and Pratt, Illinois; Marion, Hardin, and Montgomery, Iowa; Christian, Missouri.

MANGE.—Mange is reported in James City, Virginia; Smith and Lafayette, Mississippi; Wood, Texas; Stone and Fulton, Arkansas; Defiance, Ohio; Cloud, Kansas.

MISCELLANEOUS.—In Montgomery and Berks, Pennsylvania, hogs from the West exhibited a considerable mortality, while native hogs did very well. An unknown disease was observed in Cameron. Another was developed among pigs in Washington; the prominent symptoms were cough, heaving flanks, high fever; death supervened in forty-eight hours. In Southampton, Virginia, an undesignated malady inflicted great loss; symptoms variable; sometimes the whole body was covered with sores; cough, loss of bristles, &c. In Burke, North Carolina, "measles" carried off 25 per cent. An unknown disease was destructive in Perquimans. In Catoosa, Georgia, some fattening hogs died very strangely in a few hours, turning green after death. The disease was too wide-spread to have been caused by poisoning. Half the stock-hogs of Jefferson, Alabama, were destroyed by some unknown malady; they were very poorly fed. In Bell, Texas, many fine hogs, in good condition, refused to eat for several days, and then died frothing at the mouth, in apparently great distress. Many hogs were poisoned by cuckold burrs in Red River, Kauffman, and Collin. These were not injurious if the hogs had other feed. In Harrison some died of eating cotton-seed, and in Upshur from eating bitter mast. Kidney-worms are noted in Upshur and Cherokee. In the last named a new disease called staggers is noted; symptoms, blindness, giddiness, jerking of the whole system; death in a few hours. In Medina a loin disease, incurable, destroyed 7 per cent. In Lucas, Ohio, kidney-worms were successfully treated with soapsuds, arsenic, sulphur, &c. In Sangamon, Illinois, a new disease appeared; symptoms, blindness in the right eye, deafness of the right ear, right leg and shoulder weak, head carried right side down; death in three to ten days. In Clinton, trichinæ and catarrh were associated with cholera and quinsy. In Clinton, Iowa, a serious lung disease is attributed to the practice of permitting hogs to sleep in piles under straw stacks; coming suddenly into the cold air, they contract disease. A strange fatality has been developed among hogs in Placer, California. Animals apparently in perfect health at night are found dead in the morning; loss estimated at 7 per cent. up to date of report. The losses from starvation and neglect are in many localities almost frightful.

FRENCH SCHOOLS OF AGRICULTURE.

The statistician last summer obtained at the office of the ministry of agriculture and commerce in Paris a variety of official data relative to the French system of agricultural education, with current reports of progress, from which a few facts may prove interesting. The system originally embraced three classes of schools. A central university or agronomic institute, at Versailles, presenting the highest range of instruction, was abolished in 1853, a piece of questionable economy, deeply deplored by French agronomists. Next in rank were three intermediate or high schools, called regional schools, on account of their special adaptation to the needs of the northern, western, and southern regions of France. The school of Grignon, in the department of Seine-et-Oise, not far from Paris, devotes special attention to *grande culture*, to grasses, cereals, and industrial crops, to stock-breeding and to the agricultural and viticultural interests of northern France generally. An agricultural station is attached to the institution. The school of Grand Jouan, in the department of Loire-Inférieure, studies especially the best methods of bringing virgin lands under cultivation, mixed pastoral husbandry, tenant farming, natural meadows, live-stock breeding, industrial and fruit crops, and the agricultural industries of the western departments in general. The school of Montpellier, in the department Hérault, represents the agricultural peculiarities of the Mediterranean region, embracing live-stock breeding, the replanting of forests, irrigation, silk culture and manufacture, and the agricultural, pomological, and viticultural interests of the region of the olive, the mulberry and the orange. It has a sericultural and a viticultural station attached.

These and all other agricultural schools are under the direction of the minister of agriculture and commerce, to whom applications for admission are addressed. By special indulgence foreign students may be admitted. Each applicant must present a record of his birth, a certificate of moral character from his mayor, a medical certificate, showing that he has been vaccinated or has had the varioloid, and a satisfactorily-indorsed obligation to pay the tuition charges at the beginning of each term. Pupils are divided into internal and external pupils, and free hearers. The latter are admitted by the director of the school, who notifies the minister of the fact. Applicants are examined in arithmetic, algebra, plain geometry, (four books,) surveying, draughting, leveling, physics, hydrostatics, hydraulics, chemistry, geography, &c. A bachelor of science is exempt from this examination.

The courses of theoretic study embrace agriculture, horticulture, viticulture, sylviculture, sericulture, natural history in all its branches, zoology and zootechny, physics, mechanics, chemistry, meteorology, mineralogy, geology, topographical engineering, agricultural construction, rural economy and legislation, rights of administration, agricultural book-keeping, &c. Practical instruction embraces laboratory practice, analysis of soils, fertilizers, agricultural products, &c., water gauging, canal construction, irrigation, agricultural machinery, manipulation of fruits and vines, live-stock management, cereal, grass, and industrial crops, fabrication of alcohol, wine, and oil, farm management, &c. Pupils passing a satisfactory examination on the completion of these courses receive a certificate or diploma. These graduates may upon the completion of an additional course receive the degree of agricultural engineer. Of these latter graduates a few may obtain two years "stages" in private or public agricultural establishments. These "*stagiaires*" may

be sent to study the agricultural resources of foreign countries, and to investigate special subjects, presenting a memoir of their investigations to the administration. Internal or boarding pupils pay a charge for tuition and board of 750 francs per annum; external pupils and free bearers are charged 200 francs per annum for tuition. The school at Montpellier does not receive boarding pupils.

The third grade embraces the primary or farm schools, of which there are forty-three in operation in various localities. These are established by decree of the minister of agriculture designating the name, location, number, and age of pupils or "apprentices," the length and character of the course of study, the *personnel* and salaries of the board of instruction, &c. In the pastoral regions schools are allowed to receive one apprentice for every four or five hectares (10 to 13 acres) in the cultivable domain attached; in the regions where grain-culture is pursued thirty pupils are allowed for each 100 hectares, (247 acres.) Each school must accommodate at least twenty-five. Great care is exercised to make the number of pupils proportionate to the work to be performed. The age of admission varies from fifteen to thirty years. The government pays the director 270 francs per annum for the board of each apprentice. Apprentices perform the labor of cultivation, and receive regular wages. They also pursue a prescribed course of study, and are at regular intervals examined thereon. The director, who is either owner or tenant holder of the domain, receives for his remuneration a salary of 2,400 francs per annum besides the profits of cultivation.

The course of study, which generally lasts but two years, is of the most practical character, though some schools enlarge their theoretical and literary instruction. The board of instruction consists of the director, who is also professor of agriculture, horticulture, zootechny, &c., a superintendent of accounts, whose office is to supply the lack of primary instruction and to teach proper methods of keeping farm accounts, &c.; a gardener and nursery-keeper, whose duty is to teach practical horticulture; an overseer of laborers, and a veterinary surgeon. Sometimes a chaplain is attached to the staff; but he takes upon him, in addition to his spiritual functions, some branches of secular instruction. The directors are mostly graduates of farm-schools, though one or two have received university degrees. Occasionally a prince, count, baron, or retired army officer occupies the chair. The subordinate members of the board of education receive salaries ranging from 500 to 1,500 francs per annum. Each school has a farm varying from 100 to 1,100 acres, generally well stocked with farm-animals, and furnished with the most approved farm-implements. Every facility is offered for thorough practical instruction in agriculture, horticulture, viticulture, stock raising and management, business management, &c. Each school aims to suit its instruction and cultivation to the regions in which it is located. A complete record of the operations of these schools would afford facilities for a most satisfactory general study of French agriculture.

These schools are under the supervision of six inspectors-general of agriculture, who parcel out the territory of the republic among them. The French ministry of agriculture has commenced a series of annual publications containing extracts and compilations from the reports of the inspectors-general. The first of this series, that of 1872, represents these schools generally in a favorable condition, though all were more or less injured by the late war. In several instances the excessive requirement of manual labor is sharply criticised as not only trenching upon the hours that should be devoted to study, but as also repressing

the spirit of intellectual exertion and disqualifying the pupil for effective study.

The following is an abstract of the leading points reported by Inspector-General Boitel whose jurisdiction, covering fifteen central departments, includes four farm-schools:

Schools.	Departments.	Date of organization.	Pupils.		Graduates.	Years in course.	Hours of labor.		Hours of Study.		Acre in school-farm.	Age of admissibility.
			Normal.	Supernumerary.			Winter.	Summer.	Winter.	Summer.		
Chambandoin	Loiret	1848	30	....	242	2	9	10	2	1	444	18 to 22
Hubaudières	Indre-et-Loire	1852	33	....	166	2	8	10	5	1½	400	16 to 24
Laumoy	Cher	1849	33	8	222	2	8	11	4½	2	343	17 to 26
Saint-Michel	Nièvre	1843	33	4	297	2	9½	10½	3	4	417	17 to 21

The processes of culture, the financial management, and the practical instruction in these schools appear to have been quite satisfactory to the boards of examination as well as to the inspector-general. The systems pursued, while generally adapted to the wants of the region they represent, present special features adapted to local circumstances. The school of Chambaudoin is a school of *grande culture*, and directs special attention to the training of farm-superintendents. Its methods of culture and breeding are of the most scientific character. Great caution is exercised in recruiting the flocks and herds depleted by the late war. Its domain is very fertile. On the contrary, the school of Hubaudières is located in one of the most sterile cantons of Lorraine, upon a farm held by a long lease, with stipulations for reimbursement for soil-improvements. Its small area of good land is subjected to an intensive culture, producing large crops. Its farm-implements are excellent, and its system of records satisfactory. Charmoise sheep and Craonnaise hogs are bred on the farm. The departmental council-general awards 500 francs annually in prizes.

The school of Laumoy is especially commended for its soil-improvement. It has a working capital amounting to $40 per acre, and keeps 2,000 pounds of live stock per acre. The special aim of instruction here is to impress the value of judicious culture, and to illustrate the power of capital intelligently applied to production. Its theoretical instruction is not equal to its practical. The Agricultural Society of Bourges annually awards a series of silver medals.

The school of Saint-Michel, among the foot-hills of Morvan Mountains, has taught the rude mountaineers how to grapple with natural difficulties. It has enhanced the rate of production, and introduced a better kind of crops; yet from the granitic soil it has not been able to extract a sustenance sufficient for the Charolaise cattle, while its sheep are only the common breeds suited to meager pastures. Its excellence of theoretic instruction has attracted a large number of pupils, in spite of its inferior physical resources.

Seven schools are reported by Inspector-General Tisserand in his jurisdiction of eleven northeastern departments, as follows:

Schools.	Departments.	Date of organization.	Pupils.		Graduates.	Years in course.	Hours of labor.		Hours study.		Acres in school-farm.	Age of admissibility.
			Normal.	Supernumerary.			Winter.	Summer.	Winter.	Summer.		
Étoges	Marne	1870	30	....	.....	2	8½	10	2½	1	322	18 to 19
La-Malgrange	Meurthe et Moselle	1868	24	1	10	2	8	10	3½	2	262	17 to 24
Saint-Eloi	Haute-Marne	1868	24	9	11	2	8	11½	4	1	483	16 to 22
La-Roche	Doubs	1869	33	3	10	2	9	11	3	1	312	16 to 23
Saint-Remy	Haute-Saône	1851	32	33	682	2	6	8	6½	4	335	17 to 22
La-hayevaux	Vosges	1849	30	2	256	2	9½	10	2½	2	240	16 to 21
L'Orme-du-Pont	Yonne	1848	33	....	192	3	8	9½	3	2	403	16 to 22

The condition and operations of these schools are generally satisfac tory; but in two instances the inspector-general criticises the lack of a weighing-apparatus, without which it is impossible to test and record accurately the results of cultivation. The school of Étoges maintains a large vegetable-garden, with ample resources for illustrating the processes of vine and fruit culture. Fertilization is systematically and energetically prosecuted. A neighboring swamp yields about 140,000 pounds of muck per annum, while about 10,000 pounds of domestic manures are applied to each acre, besides guano, purchased for wheat-growth, and salts of potash, furnished by the salines of Beer, at fifty cents per hundred pounds, which have made good crops of lucern in calcareous soils. The cows are of the Normandy breed.

The school of Malgrange, near Nancy, upon its diluvial and easily worked soils, alternates grain and root crops. Its stronger lands, after thorough drainage and liming, are subjected to a four years' rotation: 1, roots or half-fallow for colza; 2, winter-grain; 3, clover and annual forage-plants; 4, oats. The farm-animals furnish nearly a million pounds of manure, and about the same quantity of mud is brought from the streets of the neighboring city. The eastern agronomical station performs its experiments on the farm, adding a valuable element to the course of instruction. The school of Saint-Eloi strongly recommends salts of potash for silico-calcareous soils. It uses freely of oil-cake for stock-food. Its sheep-fold contains 450 metis-merinos, served by rams of the silky-fleeced Mauchamp breed; the Dishley rams will be introduced hereafter as suited to a more intensive sheep-husbandry. The piggery is recruited from the Berkshire breed. The low grade of study here is justly attributed to excessive labors, but the price of hired labor is alleged in palliation. The school of La-Roche is greatly benefited by the annual reunions of the Agricultural Society of Doubs on its farm. Besides a regular farm-equipment, it has a flour-mill and circular saw, driven by a portable steam-engine, which also drives a thrashing-machine, a laundry, and a root-cutter. A distillery, a Gruyère cheese-dairy, producing 15,000 pounds of cheese per annum, and a forge, give considerable extra employment to pupils. A four-year rotation is followed: 1, weeded plants; 2, wheat; 3, half clover and half annual forage-plants; 4, two-thirds oats and one-third rye. This rotation is maintained by heavy manuring. A large number of farm-animals are kept, and oil-cake and sugar-beet pulp are purchased to supplement

the heavy gras -crops, for their support. Forty cows are kept, besides a fine flock of white Appenzel goats, a celebrated milk-bearing breed. The board criticised the neglect of making the management of cows a part of the course of instruction, a fault which will be remedied hereafter. The programme of studies embraces six lessons per week in summer and ten in winter.

The school of Saint-Remy is eulogized as the most effective of the farm-schools, and as having sent forth the largest number of graduates—682. Its board of instruction is also the largest. Its arrangement of lands and buildings is artistic as well as scientific, presenting a fine monumental aspect. The cattle are of the Femeline and red Oignon breeds; the sheep mostly Dishley merinos, with a few crosses of Dishley's and Southdowns. The system of instruction is complimented as a happy mingling of study and labor, the proportion of time allotted to each being about equal in winter. Shops for special manufactures in wood, iron, &c., give a wider scope for intelligent industry. The school of Lahayevaux, in process of re-organization, promises higher results than formerly, although it has enjoyed a superior reputation. The school of Orme-du-Pont is located in a county of *grande culture* and of large landed proprietorships. In a six-year rotation, in which cereals regularly alternate with weeded or forage crops, it seeks to produce an immense mass of forage for animals, and, consequently, a large supply of fertilizing material. Too much time is here given to manual labor.

Inspector-General Malo reports as follows, concerning seven schools in his fourteen central, eastern, and southeastern departments:

Schools.	Departments.	Date of organization.	Pupils.		Graduates.	Years in course.	Hours of labor.		Hours of study.		Acres in school-farm.	Age of admissibility.
			Normal.	Supernumerary.			Winter.	Summer.	Winter.	Summer.		
Pont le Veyle	Ain	1849	24	5	328	2	10	12	3	1	177	12 to 22
La Chassagne	Cantal	1869	24	....	.....	2	8½	10	5	1	497	16 to 22
Des Plaines	Corrèze	1849	27	6	387	2	10	11½	.....	1	462	16 to 22
La Villeneuve	Creuse	1849	33	3	.....	2	10	11	1	1	960	18 to 26
Merlieux	Loire	1869	30	4	.....	2	10	12	4	2	474	16 to 21
Montat	Lot	1849	32	2	293	2	10½	10	5	3	290	18 to 21
Montceau	Saône-et-Loire	1849	33	....	262	2	9	11½	4	1	476	17 to 21

These schools are in a good condition and present results which the inspector-general regards as satisfactory. The school of Pont-le-Veyle makes a specialty of fruit-culture, but by energetic fertilization it makes its poor soil bring good crops of grain and grass when the inundations of the Veyle do not interfere. Its yield of rye reaches 23 bushels per acre; wheat or barley, 27½; beans, 32. The rotation is quadrennial, embracing a large proportion of forage-crops. The school of La Chassagne cultivates fields 3,000 feet above sea-level, the soil being mostly volcanic detritus, partially drained and irrigated. The leading industry is necessarily pastoral, embracing cheese-manufacture. The cattle are a local sub-race derived from the Aubrac breed, which, by improved methods of breeding, has been brought to a higher yield of milk. The sheep are the local varieties crossed with the Charmoise. The school Des Plaines is also located on poor soil at a high elevation, 2,000 feet. Its most profitable branch is cattle-breeding, especially its

Salers cows. The sheep are Charmoise. A biennial rotation is used; rye yields 23 bushels per acre and oats 40. The school of Villeneuve presents cultural and economic conditions analogous to the two last named; very unpromising resources have received a considerable development. The school of Merlieux illustrates the process of redeeming lands wasted by previous improvident culture. It follows a five-year rotation: 1, weeded plants; 2, winter or spring grain; 3, meadows for mowing or pasturing, maintained for three years. Lime is applied with excellent results. The school of Montat practices a four-year course upon calcareous and permeable soils, and a biennial course, with liming, upon stronger lands. Stolen crops of turnips, carrots, cabbage, and corn-fodder are raised for stock-feed. Winter-grain and grapes are the money-crops. The cattle number less than one head for every four acres. Wheat yields from 23 to 29 bushels per acre; oats, 57; prairie-hay, 4 tons; sugar-beets, from 10 to 11 tons. The school of Montceaux has replaced its former two-year rotation with an intensive culture extending through five years; the wheat-yield has been raised to 32 bushels per acre; rye to 29; oats to 57.

The following points have been tabulated from the report of Inspector-General Lembezat concerning nine schools in sixteen southwestern departments:

Schools.	Department.	Date of organization.	Pupils.		Graduates.	Years in course.	Hours of labor.		Hours of study.		Acres in school-farm.	Age of admissibility.
			Normal.	Supernumerary.			Winter.	Summer.	Winter.	Summer.		
Chavaignac	Haute-Vienne	1847	33	....	299	2	8	9	5	2	573	17 to 23
Monts	Vienne	1849	24	....	179	2	9	11	3	2	361	18 to 19
Machorre	Gironde	1868	24	....	.....	2	7	9	5	2	90	16 to 20
Lavallade	Dordogne	1847	33	....	318	2	8	10	5	2	333	16 to 23
Beyrie	Landes	1849	27	....	282	2	9½	10	3	1	289	17 to 23
Tolu	Basses-Pyrénées	1849	24	....	230	2	9½	11	3	2	233	17 to 23
Bazin	Gers	1847	30	....	224	2	8½	11	4	1	230	17 to 24
Royat	Arriège	1849	33	1	307	2	8½	9	5	3	202	16 to 22
Puilboreau	Charenté-Inférieure	1849	33		214	2	8	11	4	2½	240	16 to 22

The school of Chavaignac, with a sterile, granitic soil, cultivates mostly grass and root crops, producing excellent clover with copious liming. The Jerusalem artichoke has been successfully cultivated. The school of Monts pursues a very regular eight-year rotation, as follows: 1, weeded plants; 2, spring barley; 3, clover; 4, wheat; 5, colza; 6, wheat; 7, green forage-crops; 8, oats. Salers cattle are used. The school of Machorre has nearly 100 acres in vineyard, cultivated according to the most approved methods. The school of Lavallade cultivates part of its domain by the labor of its pupils, and part by tenant-farmers. Tobacco-culture is greatly impeded by a weed exceedingly tenacious of life. Natural resources are here quite unfavorable, but the course of instruction is superior. The school of Beyrie also lets out a part of its farm to tenants. It follows a six-year course: 1, sugar-beets; 2, winter vetches, followed by half-summer fallow; 3, winter-wheat, with clover; 4, red clover and forage-plants; 5, corn; 6, winter-grain, followed by a stolen crop of turnips. Viticulture, in its most improved methods, is a specialty. The status of theoretical instruction is criticised, but its defects are excused by the devastations of the war. The school of Tolu ex-

cites a similar strain of remark. The school of Bazin practices a nine-year rotation: 1, weeded plants; 2, vetches or annual forage-plants; 3, wheat and oats, with sainfoin; 4 and 5, sainfoin; 6, wheat; 7, sainfoin or clover; 8, colza and leguminous crops; 9, wheat. The school of Royat has radically changed its system, greatly reducing its annual crops and enlarging its scope of viticulture. At least 100 acres of vineyard have been planted with the common Burgundy stocks, the vines being sufficiently distant from each other to admit of thorough plow-culture. Large gardens are maintained in high efficiency by irrigation at all seasons. The school of Puilboreau also devotes special attention to the vine.

The following facts have been compiled from the report of Inspector-General Zielinski, whose jurisdiction embraces seven schools in the northwestern departments:

Schools.	Department.	Date of organization.	Pupils.		Graduates.	Years in course.	Hours of labor.		Hours of study.		Acres in school-farm.	Age of admissibility.
			Normal.	Supernumerary.			Winter.	Summer.	Winter.	Summer.		
Kerwazek-Trevarez	Finistère	1847	33	1	248	2	7¼	8	4	3½	187	17–03
Grand-Resto	Morbihan	1870	28	....	9	2	9	10	4	2	173	17–28
Trois-Croix	Ille-et-Vilaine	1832	30	2	346	2	7	8	5	5	230	17–23
Rieffelland	Loire-Inférieure	1830	30	5	410	3	9	9	4	3	297	16–22
Saint-Gildas-de-Bois	do	1840	24	....	282	2	.....	.....	.....	.....	126	16–19
Saut-Gautier	Orne	1851	33	....	191	2	9	9¼	3	1	361	15–23
La Pilletière	Sarthe	1848	24	....	.....	2	8	10	2	2	170	18–30

The school of Kerwazek-Trevarez has a working-capital of $68 per acre, upon which a return of nine per cent. has been realized. The leading industry is stock-raising, for the support of which a seven-years' rotation is pursued, as follows: 1. Weeded plants or buckwheat. 2 and 3. Clover. 4. Cereals. 5. Annual forage-plants. 6. Cereals. 7. Stolen crops. A large area of natural and artificial meadow is maintained. The school of Grand-Resto was located three years ago in the midst of a rude population that does not speak the French language, and to whom a systematic and scientific culture is entirely unknown. From this class of people, destitute of schools, it is difficult to obtain a sufficient number of pupils prepared by previous instruction to undertake the course of study. Sixty pupils of the neighboring lyceum of Pontivy pursue the labors of cultivation. A capital of $64 per acre is invested, and will be augmented according to the necessities of recuperative and intensive culture. The new methods are annually increasing the crops, while they diminish the cost of production. The school of Trois-Croix follows a six-years' rotation, viz: 1. Weeded crops. 2. Spring grain. 3. Clover and beans. 4. Oats following clover, and wheat following beans. 5. Colza, with half manuring, followed by buckwheat. 6. Wheat. This exhaustive culture is supported by the manure of a large number of farm animals, and yields large returns. The working capital amounts to $88 per acre, yielding nine per cent. A neighboring normal school sends its pupil-teachers weekly to visit the farm-school and to inspect its methods and results. The school of Rieffelland, formerly an appendage to the regional high school of Grand Jouan, follows two independent systems of rotation suited to its different classes of lands.

The school of Saint-Gildas-de-Bois, located near a reclaimed marsh, and owning a great variety of soils, has introduced several processes of culture hitherto unknown in that part of the country. It has a large capital, but its investment includes the manufacture of agricultural implements. Special attention is given to the crossing of native sheep with imported stock. The school of Saut Gautier is struggling with financial difficulties springing out of previous disasters, especially during the late war. It has been reconstituted, and is now aided by departmental subsidies. The school of La Pilletière replaces that of Chauvinière, suppressed by ministerial decree October 10, 1872. Special rotations and systems of culture are adapted to different kinds of soil. In 1871 the school obtained the grand gold medal for the introduction of superior agricultural machinery and irrigation. The council-general of Sarthe pays $25 per annum for each pupil.

Sixteen departments in the extreme southeast contain nine schools, which are thus reported by Inspector-General Du Fretay.

Schools.	Department.	Date of organization.	Pupils.		Graduates.	Years in course.	Hours of labor.		Hours of study.		Acres in school-farm.	Age of admissibility.
			Normal.	Supernumerary.			Winter.	Summer.	Winter.	Summer.		
La Montaurone...	Bouches du Rhone.	1839	33	4	359	3	7	11	3	2½	544	17-21
Saint Donat-la-Paoute,	Alpes Maritimes.	1863	33	3	168	3	10	10	3	2	349	16-22
Germainville	Pyrénées Orientales.	1849	33	....	244	3	9	9¾	4	3½	297	16-19
Besplas	Aude.....	1849	30	....	211	3	8	9	3	3	250	18-19
Nolhac.....	Haute Loire ...	1849	30	1	200	2	10	10½	3	2	187	17-20
Recoulettes.....	Lozère.....	1851	21	....	201	2	7	10½	5	1½	129	16-19
Berthaud.....	Hautes Alpes ..	1849	24	....	149	3	8	10½	4	1	174	17-20
La Batie.....	Isère	1857	33	5	195	2	.....	.....	.....	.....	225	16-22
Paillerols.	Basses Alpes...	1849	33	7	328	3	.....	.....	.....	.....	1,100	17-20

The school of Montaurone, formerly a model farm, has 90 acres of vineyard, which suffered severely from the phylloxera. A fine plantation of 12 acres of olives was severely injured by frost in the winter of 1871–'72. The school devotes its level land to grass, forage, fruit, vegetable, and flower crops, and to vineyard; its undulating lands are planted in olives, almonds, and evergreen trees. The mud and offal of the neighboring city of Grasse is utilized by the school of Saint-Donat-la-Paoute. A manufactory of perfumes has been established. The school of Germainville has reclaimed its farm from a swamp. Viticulture is the leading pursuit. The school of Besplas devotes two-thirds of its acreage to forage-plants. The school of Nolhac has been famous for good culture, and has sent out many distinguished grad tes. Of late years the ill-health of the director has somewhat crippled its operations. The school of Recoulettes is criticised for having pushed the culture of sainfoin to too great an extent. The school of Berthaud contends with great difficulties, growing out of insufficient capital. It cultivates almonds, olives, and vines. The school of La Batie is highly complimented for extensive improvements, excellent methods, and satisfactory crops. A gold medal was awarded the director. The school of Paillerols presents the greatest variety of culture in the southern region. Its level plain is irrigated and subjected to

a judicious rotation of cereal, root, and forage crops. Flowers, shrubs, and industrial plants are extensively cultivated. Viticulture is pursued according to the most approved methods; choice almond and olive trees are also planted in large numbers.

VETERINARY SCHOOLS.—Besides the foregoing schools, several institutions for instruction in special branches have been established. Among these are the three veterinary schools at Alfort, Lyons, and Toulouse. These are under the supervision of the departmental prefects. The course of study embraces four years, and comprehends physics, meteorology, chemistry, botany, geology, zoology, anatomy, physiology, hygiene, zootechny, special and general pathology, medical and surgical therapeutics, pharmacy, sanitary police, medical jurisprudence, &c. The board of instruction consists of a director and five professors, with a number of tutors necessary to give proper instruction to all the pupils. A variety of subaltern agents are employed in the administration of the school. All the functionaries are appointed by the minister of agriculture. An inspector-general is appointed by the minister to supervise these schools. The management is committed to a council composed of the director and professors. The director receives a salary of 8,000 francs per annum; professors, 4,500 to 6,000; chiefs of service, 2,400 to 3,000; stewards, 3,500 to 5,000, &c. The price of tuition is 600 francs per annum for boarding pupils, 200 francs for external pupils, and 150 francs for free hearers. Applicants must present the same preliminary requisites as in the regional schools, and must pass examination upon the French language, arithmetic, geography, and French history. A regular uniform is prescribed. The school of Alfort admits forty pupils from the army, who are supported by the war department.

SCHOOL OF SHEPHERDS.—This institution, located at the Bergerie of Rambouillet, the national sheep farm of France, is intended to train young men in the management of flocks. It is open to pupils from all parts of France. Every applicant for admission as an apprentice must pass examination in his own commune, and must show that he was sixteen years old on the previous 1st day of January. The same moral and sanitary requirements are demanded as in the other schools. The pupil must be able to read and write and must understand the ground rules of arithmetic. His application and accompanying record of examination must be presented prior to the 10th of September. The school year begins October 1; every apprentice not present forfeits his standing in school. All the pupils are boarded gratuitously, receiving the same fare as the rural population of the country. They sleep near the sheepfolds in regular turn. Their course of instruction lasts two years, and no charge of tuition is made. The chief shepherd exercises them in the management of all operations of sheep husbandry, lambing, weaning, castration, pairing, gestation, parturition, shearing, folding, feeding, slaughtering, preparation for market, &c. They are taught the best treatment of sick animals. They also cultivate the land. If their primary instruction is defective it is supplied by special teaching. Their instruction is tested and completed by the sub-director. After two years of pupilage, if they pass a satisfactory examination, they receive a certificate with a premium of 300 francs. If they do not pass this examination they receive only 200 francs. Each pupil is required to bring with him a stated amount of clothing, which his friends must keep him supplied with. The washing is done at the expense of the school.

ENTOMOLOGICAL RECORD.

By Townend Glover, Entomologist.

Luminous Beetles.—As it does not appear to be generally known that a luminous beetle closely resembling the "*cucuyo*" or fire-fly of the West Indies is found abundantly within the limits of the United States, and although the fact may not be of any value to the agriculturist, it must yet be interesting to entomologists in general. We, therefore, make extracts from a letter from a valued correspondent, Mr. N. B. Moore, Manatee, Florida, who at the same time forwarded with his letter specimens of an insect, which proves to be the *Pyrophorus physoderus*, (Fig. 1,) a species of snapping-beetle, and closely resembling the *Pyrophorus noctilucus*, (Fig. 2,) or far-famed fire-fly of the West Indies, with exception of size, as will be seen by the wood-cuts.

Fig. 1.

Fig. 2.

Mr. Moore writes that "these insects are very plentiful on the 'pine barrens' and among saw-palmettoes, having captured as many as nineteen on the 28th of August. The common 'lightning-bug,' or fire-fly, (*Photinus pyralis*,) is also abundant, but appears an hour earlier in the evening, and, no doubt, has often been mistaken for this insect. In its manner of flight the Pyrophorus seldom rises more than three feet above the earth, so as to pass close over the tops of the vegetation. Their flight is also much slower and more meandering. The light is emitted from the reservoirs of the thorax at the base of the spines and through them. When on the wing it is generally, if not always, continuous, and equal in amount, as seen from above or below. I do not think it is remittent, and there is no flash, and in amount there is less than the *Photinus pyralis* emits at the time of its flash; there is no perceptible difference in the color of the light of the two species except that which rises from degree of intensity. Its utmost luminosity is attained when running on the ground. When placed upon a quilt or pillow an almost dazzling effulgence emanates from the thoracic reservoirs, seemingly from the disks or perhaps globes, one at the base of each spine. If caught and held between the thumb and finger gently, the same effulgence is emitted. If the insect stops running or takes wing the light emitted is much less, though a fixed increment.

"Experiments in a dark room, with eighteen of the *Pyrophorus* and one of the common *Photinus* on a table, enabled me to compare the light of one of the former with that of the latter at their maximum brilliancy, and I find them about equal; though, as one is a flash and the other a continuous light, I think the latter is really superior. I have not found the one, when in its native habitat, intruding upon the possessions of the other, but they keep apart. When examining them with a glass, I discovered, while observing one that lay upon its back, other sources of illumination; luminous dots, in pairs, were first detected along the lateral margins of the abdomen, and transversely opposite; the anterior pair rather faint, indeed not discovered till after the next succeeding pair were seen; the next bright; the third pair I would rate between them in luster; a fourth pair a little fainter; these, united by a line of light extending across the abdomen, at the junction of the segments. I could discover no trace of concurrent or sympathetic action between the light emanating from the thorax and that from other parts

of the body, nor could any mode of teasing the insect induce an augmentation or diminution of light from the last.

"The *Pyrophorus* has a habit, before it becomes jaded, of throwing itself up from the ground or other surface when placed upon its back, by a spring or jerk of the head downward, and can throw itself to a height of six or eight inches. I found the combined light of eighteen, in a two-ounce vial, sufficient to enable me to read a newspaper, as one could desire to do in a public assembly."

In answer to a request for living specimens, Mr. Moore replies that those he confined died in less than thirty-six hours.

POKE-ROOT FOR DESTROYING INSECTS.—Dr. F. C. Renner, of Frederick County, Maryland, writes to the Department that several years ago he collected some poke-root (*Phytolacca decandra*) for medicinal purposes, and placed it at various places about the house, to dry. After several days he observed that there were many cockroaches lying dead, and upon examination found they had been partaking freely of the poke-root. Some of the root was placed near their haunts, and the result was that it rid the premises of those insects. Since then he has communicated the remedy to others, who have tested it with satisfactory results.

We have not yet had an opportunity of trying the efficacy of the root as an insecticide, but shall test it in the spring. Should any of our correspondents have experimented with it, they will oblige us by giving the result of their experience before we venture to recommend it for general use.

CHEMICAL MEMORANDA.

BY WM. MCMURTRIE, CHEMIST.

This Department has received from Messrs. Geo. R. Hill & Co., Alexandria, Va., a sample of offal from their hominy mills, with the following communication:

Recent experiments by farmers in Connecticut and New Jersey having determined that corn-meal is a most valuable fertilizer, (equal in some cases to guano,) we have the honor to forward this day, by express, a specimen of the offal from our hominy mills, composed principally of the *hearts* or *germs* of the corn, and hence believed to be the more valuable, (as the phosphatic element so largely predominates,) and respectfully ask that you will cause an analysis of the same to be made at an early day.

In response to the request embodied in the above communication, a complete analysis has been made, the following results having been obtained:

One hundred parts of the material contain:

Moisture			6.38
Organic matter	Oil	7.50	91.4875
	Sugar	1.50	
	Gum	2.4982	
	Zein	1.8400	
	Starch	65.9732	
	Albuminoids	6.1961	
	Cellulose	5.9800	
Inorganic matter	Silica	0.1479	2.1319
	Lime	0.0797	
	Magnesia	0.1014	
	Peroxide of iron	0.0424	
	Phosphoric acid	0.9698	
	Potassa	0.6237	
	Soda	0.1670	
			99.9994

One hundred parts of mineral matter contain

Silica	6.937
Lime	3.729
Magnesia	4.756
Peroxide of iron	1.988
Phosphoric acid	45.489
Potassa	29.251
Soda	7.834
	99.984

Nitrogen in organic matter 1.1203

We find that the quantity of ash amounts to 2.13 per cent., making the total amount of phosphoric acid about 0.97 per cent., and potassa about 0.62 per cent. Comparing these figures with those found in the analyses published by Wolff,* we find that the average amount of ash found in corn is about 1.40 per cent., making the total amount of phosphoric acid in the grain about 0.66 per cent., and potassa 0.39 per cent. This shows that in the hominy-offal there is an increase of but about one-third in the amounts of these constituents, and when we calculate the value of the material according to the standard for commercial fertilizers, and admitting that the phosphoric acid, potash, and nitrogen are all available as plant-food, it would be $3.70 per ton of two thousand pounds. Now, when it is so easy to procure fertilizing materials in a much more concentrated condition, at the same rates, it is quite evident that it would not be profitable to make use of the material in question as a fertilizer. But if we consider its value as feeding material, upon comparing the above analysis with that of the analysis of white corn grown upon the eastern shore of Maryland,† we see that the material difference is not very great. The total amount of cellulose and mineral matter, 8.11 per cent. in the former and 2.77 per cent. in the latter, would not make a difference of more than two or three dollars per ton in their value, even if we admit that these constituents are valueless for this purpose. So that when the price of corn-meal averages from $35 to $40 per ton, it is plain that it would be much more practical and economical to make use of the hominy-offal as feeding-material for cattle than for the purpose indicated by our correspondent.

SCIENTIFIC NOTES.—*Passage of matter in plants.*—In a late number of "*Die landwirtschaftliche Versuchs-Stationen*," Dr. L. Rissmüller has published the results of some experiments upon the above subject, in the course of which he made analyses of the leaves of the beech at different stages of development. He finds that the proteine bodies and hydrocarbons, as well as the phosphoric acid and potassa, increase until the month of July, when they reach a maximum, and that after this time they steadily decrease until the close of the season. He has been led to the conclusion, from the results of all his investigations, that there is a relation between the potash and the formation of hydrocarbons, as well as between the phosphoric acid and protein bodies. These mineral constituents not only vary with the organic constituents during the entire period of growth of the leaves, but also pass with them into other organs of the plants which continue over to succeeding years, increasing them or serving as a reserve for nourishment for the next period of growth. He considers that it does not follow that the lime and silica in any way affect the production of cellulose, but that they merely

* Aschen-Analysen page 36. † Monthly Report, April, 1873, p. 169.

act as incrusting materials, or particularly in case of the lime, to combine with acids, such as oxalic, which undergo no further metamorphosis at the close of the period of growth. We give below a table showing the analytical results which he obtained:

One thousand parts of fresh beech-leaves gave—

Water	766.5	597.9	563.6	492.6	525.8	496.3	594.5
Dry substance	233.5	402.1	436.4	507.4	474.2	403.7	455.5

One thousand parts dry substance gave—

Cellulose	144.60	209.70	219.60	221.90	214.40	212.50	255.20
Non-nitrogenous extract	502.60	524.73	494.58	489.58	505.08	504.10	493.08
Fat	23.60	24.20	18.20	20.10	48.40	55.40	49.40
Proteine bodies	282.50	189.37	193.12	178.12	143.12	120.00	78.12
Ash	46.70	52.00	74.50	90.30	89.00	108.00	114.20
Soda	1.53	0.68	0.28	0.75	1.03	1.70	1.58
Potassa	14.58	11.31	8.84	8.86	9.37	8.28	6.60
Peoroxide of iron	0.35	0.51	0.58	0.75	1.03	0.60	0.59
Lime	6.78	12.93	20.81	28.96	28.86	33.80	37.60
Magnesia	3.57	5.95	6.85	7.59	7.25	7.55	8.20
Phosphoric acid	9.93	4.39	3.91	4.09	3.77	3.47	1.24
Silicic acid	0.87	5.44	12.13	17.31	16.23	25.15	26.4

One hundred parts of ash gave—

Soda	3.28	1.32	0.37	0.83	1.16	1.58	1.34
Potassa	31.23	21.74	11.85	9.81	10.53	7.67	5.78
Peroxide of iron	0.76	0.99	0.78	0.84	1.17	0.56	0.58
Lime	14.96	24.25	27.82	32.08	30.37	31.29	32.92
Magnesia	7.65	11.44	9.18	8.40	8.15	7.00	7.15
Phoshoric acid	21.27	8.43	5.24	4.53	4.24	3.22	1.08
Silicic acid	1.87	10.47	16.26	19.17	18.23	22.36	23.18
Undetermined	18.98	21.36	28.50	24.34	26.15	26.32	27.96

Liberation of ozone by plants.—In a note by J. Bellucci upon this subject, presented to the Academy of Sciences of Paris, the author reviews the statements of M. Scoutetten and M. Cloez with this regard, and their methods for obtaining the results which formed the basis of their conclusions. Believing that they were erroneous, he instituted a series of experiments to substantiate his own views. He caused a current of air to pass into a glass vessel of ten liters capacity, containing growing plants, and in some cases branches or leaves recently cut. Before entering the vessel the air passes through a glass tube sixty centimeters in length, half of which is covered with black paper, the other half remaining under the ordinary conditions. Having entered the vessel it passes out through another tube similar to that just described, and from this into the atmosphere. In the interior of each of these tubes are placed iodized starch papers, one in the clear part and another in the dark portions of the tube. The air, which traverses the apparatus at the rate of 20 liters per hour, may be humid and may contain $\frac{1}{100}$ its volume of carbonic acid. The apparatus is completely exposed to direct sunlight during the experiment.

The results thus obtained are shown in the following table:

Date.	Duration of experiment.	Condition of atmosphere.	Names of the plants placed in the apparatus.	First tube.		Second tube.	
				Clear portion.	Dark portion.	Clear portion.	Dark portion.
			LIVING PLANTS.				
1871.	*rs.*						
July 22	1	Clear	*Pelargonium hortulanorum*	0.5	0.0	0.5	0.0
22	3	...do	...do	2.0	0.0	1.5	0.0
Aug. 3	3	...do	*Pelargonium odoratissimum*	2.5	0.0	2.5	0.0
3	3	...do	...do	3.0	0.0	3.0	0.0
8	2	Slightly cloudy	*Thymus vulgaris*	1.5	0.0	1.5	0.0
8	3	...do	...do	3.0	0.0	3.0	0.0
10	3	...do	*Dictamus albus*	3.5	0.0	3.5	0.0
10	1	...do	...do	0.0	0.0	0.5	0.0
12	3	...do	*Lactuca sativa*	2.0	0.0	2.0	0.0
12	3	...do	...do	3.0	0.0	3.0	0.0
19	3	...do	Grasses with *triticum repens* and *trifolium repens.*	2.0	0.0	2.5	0.0
19	3	...do	...do	2.5	0.0	2.5	0.0
			PORTIONS OF PLANTS RECENTLY CUT.				
21	1	Clear	Leaves of *Lactuca sativa*	1.0	0.0	1.0	0.0
21	2	...do	...do	1.0	0.0	1.5	0.0
27	2	...do	Roots of *Salvia officinalis*	1.0	0.0	0.5	0.0
27	2	...do	...do	1.0	0.0	1.0	0.0
29	2	Slightly cloudy	Roots of *Juniperus Virginiana*	2.0	0.0	2.0	0.0
29	2	Clear	...do	2.5	0.0	2.5	0.0
1872.							
Aug. 14	3	Slightly cloudy	Leaves of *Acer platanoides*	1.5	0.0	2.0	0.0
14	3	...do	...do	2.5	0.0	2.5	0.0

The following are the conclusions arrived at by Bellucci from the results shown in the preceding table:

1. Since the papers are not colored alike in the dark and lighted portions of the tubes, this reaction cannot be attributed to the ozone supposed to be in the atmosphere passing through the apparatus.

2. That since the papers in the lighted portions of the tubes, both at the inlet and outlet of the apparatus, are similarly colored, the coloration of the latter cannot be due to the chemical activity of the air caused by its transmission over the green plants.

3. That since the possibility of the presence of ozone is excluded by the preceding considerations, the reactions in question prove the theories of M. Cloez, who attributes the coloration to the complex and simultaneous action of oxygen and solar light independently of ozone.

4. The fact that it is quite evident from these experiments that ozone is not produced by living plants, gives a value also to the results obtained from the experiments with the parts recently cut, since it is well known that the functions of the chlorophyll continues the same in the cuttings as in the plants from which they are taken.

Sausages colored with fuchsin.—The artificial coloring of meat has been carried on to such an alarming extent at Jena as to attract the attention of scientific men. The red coloration of fresh meat is due to blood corpuscles or blood-coloring matter, which disappears upon the approach of decomposition. This also takes place in smoking beef when the operation is not carried on quickly, and want of this coloration is considered a sign of poor quality. To restore this some of the dealers have made use of fuchsin, and the consumption of meat treated with this substance has in all cases been followed with injurious results. The results, which

might be due to the action of the aniline color alone, are also due to a certain extent to the arsenic it contains, as well as to the partial decomposition of the meat which it often masks, but does not, by any means, remove. This fraud may be easily detected by treating a sample of the suspected meat with alcohol or ether; the fuchsin, if it be present, being soluble, will be extracted, while the blood-coloring matter will remain behind. The aniline red will appear, but, upon addition of a little acid, it will be removed. Soda or potash will change the red to yellow, or render the solution almost colorless.

Uredo, its chemical properties.—In certain localities this species of fungus is very abundant, appearing upon the corn, increasing the grain to a large oval bladder, which becomes filled with a brown or reddish powder; the ear is sometimes entirely covered, thus increasing so much in size and weight as to cause the peduncle by which it is supported to bend. M. Harsten, who has examined it chemically, reports upon it as follows:

The coloring-matter seems to be intimately incorporated in the material forming the cell-walls, and cannot be extracted by any of the solvents generally used for this purpose, since it fails to be taken up by ether, absolute alcohol, benzole, petroleum, chloroform, acetic acid, or caustic potassa. This fungus, when heated dry at 100° C., is perfectly ordorless, but when boiled with water it liberates an intense bituminous and very disagreeable odor. By condensation of these vapors a fetid liquid is obtained, in which, after standing twenty-four hours, small drops of a camphorous material are formed, which, when examined with a microscope, show a crystalline structure. The cell-walls show considerable resistance to the action of acids. Warm sulphuric acid attacks them but slightly, producing sulphurous acid; acetic acid and boiling caustic potassa fail to produce a noticeable effect, but if it be boiled with dilute sulphuric acid a strong odor of bees-wax is developed, a volatile acid and an inflammable gas are liberated. A cold mixture of sulphuric and nitric acids in proportions necessary to the production of pyroxylene renders the color of uredo pale, without otherwise changing its appearance. After being washed and dried it burns easily, without explosion. Nitric acid causes it to swell, and then attacks it, producing a strong odor of bitter almonds; the cell-walls gradually disappear and the liquid contains oxalic and suberic acids, and a very considerable quantity of fat. The weaker reagents seem to be incapable of extracting the fat from the uredo, unless the cell-walls be first destroyed or modified by nitric acid, chlorine, sulphuric acid, bichromate of potassa, &c. These substances cause it to yield its fat to benzine. The odor of acroleine was not perceived in its decomposition. Glycerine is also wanting. Boiling water extracts a small quantity of fixed matter partially precipitable by acetate of lead.

Tannic acid as a wood-preservative.—M. Hatzfeld presented, at one of the late meetings of the Academy of Sciences of Paris, a paper upon the preservation of wood by means of tannic acid and protoxide of iron. He urges that the tannic acid, combining with the albuminoids of the wood, is able to form insoluble tannates, and thus remove in a great measure the support of the vegetable and animal parasites, which are so abundant; that the more durable woods are those containing the greatest amount of tannic acid, and that this substance is therefore the true natural preservative. Besides injecting tannic acid into the softer woods for their preservation he proposes to harden them by further treatment with protoxide of iron. This may be applied after the tannic acid or in conjunction with it. The tannate of the protoxide of iron being perfectly colorless, blackens upon exposure to the air, and when injected into the wood, is deposited in the cells on account of this transformation, thus increasing its density to a wonderful extent.

BOTANICAL NOTES.

By Dr. Geo. Vasey, Botanist.

The Flora of Colorado.—Professor Hayden has recently issued in pamphlet form a "Synopsis of the Flora of Colorado," which embodies the results of the botanical investigations of his party in that Territory, together with those of several botanists who have made collections in that region. The work is prepared by Professor Porter, of Lafayette College, Pennsylvania, and Mr. John M. Coulter, who acted as botanist of the survey. Taken in connection with Mr. Watson's Botany of the Fortieth Parallel, it presents in a very satisfactory form our knowledge of the vegetation of that line from the Missouri to the Sierra Nevada Mountains. To show the prevalence of certain orders in that region we observe that Astragalus and Carex are each represented by 43 species, Pentstemon by 17, Ranunculus, Potentilla, and Eviogonum, each by 16, Erigeron, and Aster each by 15, Oenothera, and Artemesia each by 11 species, and Saxifraga by 13 species.

Of coniferous trees there are 5 species of pines, and 4 of abies or spruce. Of oaks there are but 2 species, both of a shrubby character, 2 birches, 10 willows, mostly low shrubs, and of Populus 3 species. These are the principal trees and large shrubs of that region. If a little more time had been taken in the preparation of the work it might have been made more complete, but as it is it will be a valuable aid to those making collections in that region, as well as to all persons interested in its vegetable productions.

Comptes Rendus for January contains a valuable essay on the production of gum in fruit-trees, by Ed. Prilling, the substance of which we give below. He treats of the production of gum under three heads, as follows:

1. *Production in vessels.*—In the wood of a tree so diseased as to produce gum, a large number of vessels are more or less filled with it either through their entire length or forming a coating more or less thick around them, or on one side. The most recent observers have admitted that the gum results from the disorganization and transformation of the inside of the walls of the vessels, but an attentive study of the production of gum in the vessels has led me to an different conviction. The gum shows itself first in very fine drops, which increase in size, touch each other, become confluent and form irregular masses, with sinuate edges. This mode of origin of gum contained in vessels appears irreconcilable with the opinion professed by German observers. The examination of large masses of gum taken from the vessels of the apricot has led to the same conclusion. These vessels are marked with areolar cavities and a spiral projection formed by a thickening of the cell-walls on the interior, and the masses of gum present on their surface furrows corresponding to the spiral lines which jut out from the walls of the vessel, and even little projections corresponding to the cavities. It is then very certain that, in this case, the gum is deposited in the interior of the vessels, and has taken the impression of the interior. This gum is of the same nature with that M. Trécul calls *cérasone.*

2. *Production in cells.—Transformation of starch.*—Gum is often seen in the medullary ray sand there offers particular interest, because its appearance is connected with the disappearance of the starch originally contained in the cells. The change of starch into gum has been noted by former observers, but never to my notion precisely described. On

the first appearance of gum in the cell. the grains of starch, still entire, are gathered into little groups, around which appears a thin layer of gum, also small portions of which may be seen deposited in other parts of the cell. The masses of starch enveloped by gum diminish continually as the layer of gum increases in thickness, but when treated by iodine the two substances preserve their special properties without modification till the starch finally disappears, usually leaving a small cavity in the center of the little mass of gum. When the production of gum commences in the tissues, an increased amount of starch is observable in the neighboring cells which seems absorbed, and immediately changed into gum, but ordinarily the gum in this case does not appear to be deposited in the cells, but passes into the neighboring reservoirs where it accumulates in considerable quantity.

3. It is neither in vessels nor cells, but rather in the lacunæ formed in the interior of young tissues, the voluminous masses of gum accumulate, which we often observe. These lacunæ are most frequently found in the cambial zone, but may be seen at different depths in the wood, disposed concentrically like successive annual layers. They are formed in the germinal layer, and then occupy the interval between the medullary rays. When not too largely developed, a new woody layer forms ouside of them, and the growth is not sensibly altered. On the contrary, if growth cease at this point, a flow of gum is caused, the woody tissue necroses and cannot be covered except by the extension of lateral portions where the germinal layer is uninjured.

The tissues next to these lacunæ suffer an important modification of development; the cambium, instead of forming woody tissue, produces cells in which an abundance of starch is deposited. There arises then, wherever gum is developed, a particular tissue (woody parenchyma) which does not exist in healthy stems, and whose appearance is so intimately connected with the morbid formation of gum, that it may be cons dered as a pathologic tissue. The starch, which accumulates in this special woody parenchyma, is used, as in the medullary rays. to form gum, which accumulates in large quantities in the lacunæ. These lacunæ increase at the expense of the neighboring tissue, which is disorganized; nevertheless, the cells which border the lacunæ often manifest extreme vital activity, and give birth to true pathologic formations. They develop, multiply, and ramify in the interior of the lacunæ, even when separated from the rest of the tissue, and absolutely isolated in the middle of the gum.

MICROSCOPIC OBSERVATIONS.

By Thomas Taylor.

J. M. Steel, of Harrisburgh, Ark., under date of August 16, 1873, writes to the Commissioner of Agriculture as follows:

I desire to make inquiry in reference to the apple-speck, or rot. Our apples on Browley's Ridge are all seriously damaged this season by a speck or blister, of the size of a dime or less, which appears on their skin. The speck becomes larger as the season advances, and the apples at length decay on the trees and fall off. This speck has been observed on our apples for some years past, but has never been so destructive to the fruit as during the last season. The fruit begins to rot when it has attained its full size, apparently from a deficiency of proper food necessary for maturing it. We sometimes think that the rot is occasioned by the sting of a curculio, but as we have no means of searching out the cause, we

apply to you, hoping that you will be able to give us a remedy. Apples, pears, plums, grapes, and berries of various kinds do well here until the ripening season approaches; hen a blight comes over them, and our flattering prospects are also blighted.

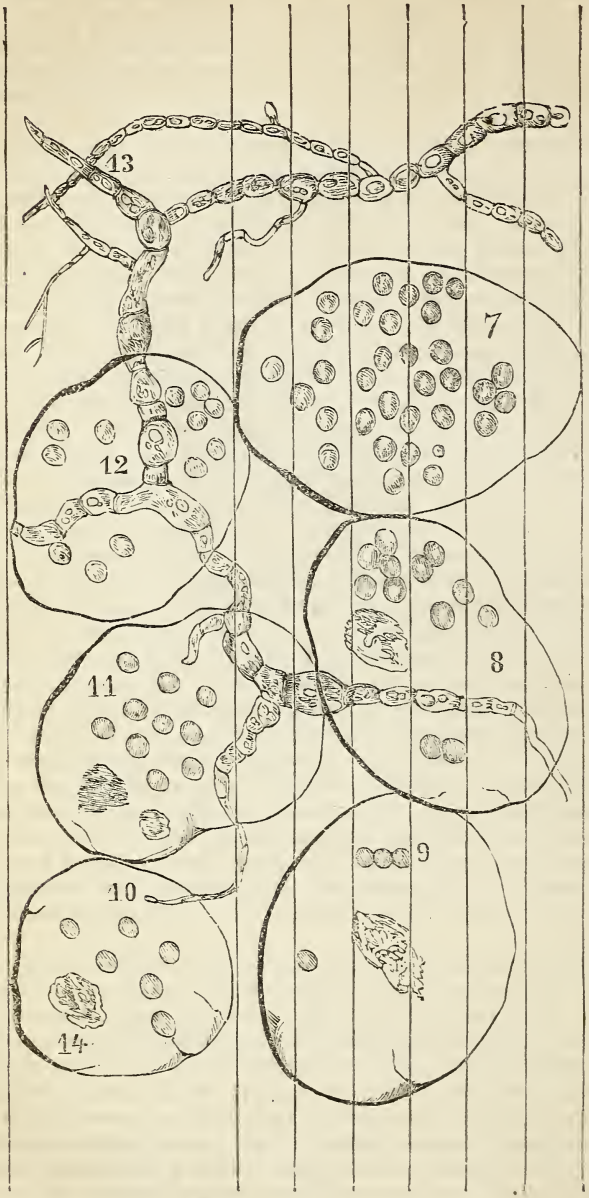
Our winter-apples are so badly damaged from rot that we seldom think of saving any for winter use. Many of our young orchards are just coming into bearing, and the prospect is quite discouraging to our farmers when they consider the prevalence of this destructive disease. Our climate has a damp and humid atmosphere, and is peculiarly adapted to cotton. Any information which will tend to improve our winter-fruit will greatly benefit the eastern third of our State.

In a subsequent letter to the Commissioner, dated October 8, 1873, Mr. Steel gives the history of the apples alluded to, and forwards a small package of them for examination. He says that the tree which bore them was a graft from the Rochester nurseries, N. Y., and was considered to be one of their best winter-apples. "Here they ripen in August and September, too early to be kept longer than December. The apple is known here as the 'Little Russet.' We esteem it a fine apple, but not a good winter-fruit. I have about forty trees from Rochester, and there are several hundred in this county, but they all ripen too early by one or two months. Apples, to keep in this climate, must hang on the trees till November or the middle of October; those that fall earlier than this will not keep through the winter. If trees can be procured which will hold their fruit till the first of November, we should be pleased to be informed where they can be obtained."

The specimens of the Little Russets, received from Mr. Steel, were subjected to several experiments. Portions of their skin were examined under low and high powers of the microscope. The dotted parts were found to be composed of clusters of circular spores of fungi combined with very small portions of mycelium. Under excessive moisture, and a morbid condition of growth, these fungi would mature rapidly, and produce fermentation in the apple. Some of the apples were cut into halves, and submitted to a temperature of about 70° Fahr. In a short time they dried up, and are now in a perfect state of preservation, thus showing that although they will not keep when whole, yet they may be preserved by allowing a portion of their superfluous moisture to escape. Another portion of the apple was placed in a quart bottle with a glass-stopper, ground to fit, and moisture was excluded. The room in which this experiment was conducted was kept at an average temperature of 70° Fahr. The apple thus inclosed was in ten days in a high state of fermentation. Portions of the rotting pulp were placed on a microscopic slide, divided into hundredths and thousandths of an inch.

Plate I, A B, represents such a scale, the larger division, A B, representing the one-hundredth of an inch, and the smaller subdivision the one-thousandth of an inch; 7, 8, 9, 10, 11, 12, represent the cells of which the apples are mostly composed. The granular dottings represent apple-starch. The branching cellular structure represents the mycelium of a fungus penetrating the cells. At 9, three small starch-granules are represented in a line, and are confined within the division of the one-thousandth of an inch. Some kinds of fruit, as the grape, under favorable conditions will eliminate a sufficient amount of saccharine matter to convert them into a candied condition while hanging on the vine, and they are by this natural process preserved from rot. Other kinds, as the apple, cannot be preserved in this way. Apples can be preserved only for a limited time on the tree. Unripe apples are composed mostly of cellulose cells, starch, organic acids, and water. During the process of ripening their starch is gradually converted into a liquid, which is saccharine. The decay of apples really sets in when their starch begins

to become liquid; because the relative amount of sugar produced, when compared with the organic acids and water present, is very small.



With a moderate heat all the conditions are presented for ordinary fermentation. The albuminoids being always present in the apple will supply the necessary food for fungi. The cells of the apple sent for examination contained very little starch and could not therefore be expected to keep well. Apples of good-keeping qualities for the Southern States should be charged with starch as late as the 1st of September, or, still better, to the middle of October. Such favorable conditions of

growth, it is believed by the most noted pomologists of the United States, can be attained only by the production of winter varieties of seedlings in the Southern States in which they are to be cultivated.

APPLES FOR THE SOUTHERN STATES.—The opinion has prevailed that the climates of the States south of Maryland are not adapted to the culture of the apple. This erroneous impression is not confined to the best apple-regions of the Northern and Western States, but it has been held by southern cultivators themselves, especially as regards good winter-keeping varieties, when grown in warmer and equally congenial climates.

Southern pomologists have long seen this matter in its true light, and have been quietly but industriously collecting winter-varieties among the seedlings originating in those States, and they can now present a list of winter-apples which, for size, beauty, and quality, are equal to those of any other section on this continent, and possessing, in addition, a peculiart exture and solidity, to be found only in fruit produced in climates where the season of growth is extended and genial, and the winters are of only moderate severity.

The following list includes a few of the most popular summer, fall, and best winter varieties known to the Department adapted for the Southern States:

Summer-apples.—Julian, Aromatic, Carolina, Large Summer, Queen, Red June, Horse-apple, American Summer Pearmain, Summer Cheese.

Fall-apples.—Hunge, Hubbard's Sugar, Bonum, (synonym: Magnum Bonum, Downing;) Cummings' Red, Golden Russet, (synonyms: English Golden Russet; English Russet; Russet Golden, Buckingham;) synonyms: Queen, Fall Queen, Winter Queen, Kentucky Queen, Lexington Queen, Byer's Red, Frankfort Queen, Ladies' Favorite, Equinetely, Ox-Eye, Bachelor, Merit, Blackburn, Henshaw, Sol. Carter, Ne Plus Ultra, King, Red Horse, Red Gloria Mundi, (Downing.)

Winter-apples.—Walker's Yellow, Camack's Sweet, Boran's Winter, Broadnax, Hall, (synonyms: Hall's Seedling, Hall's Red, Jenny Seedling, Downing;) White Winter Pearmain, (synonym: Campbellite, Downing,) and the Michael Henry Pippin of some southern nurseries; Gladney's Red, Edwards's, Payne's Winter, Rawle's Janet, (synonym: Neverfail;) Limbertwig, Faust, (synonyms: Faust's Winter, Faust's Downing;) Hoyal's Greening, Shockley, Golden Wilding, Clark's Pearmain, (synonyms: Yellow Pearmain, Gloucester Pearmain, Columbian Russet, Golden Pearmain, Downing;) Matimuskeet, Nickajack, (synonyms: Caroline, Berry, Summerhour, Accidental, Red Pippin, Howard, Hubbard, Mobbs, Cheatan, Pound, Edward, Shantee, Wall, Aberdeen, Trenham, Big Hill, Carolina Spice, Cheatan Pippin, Chatham Pippin, Wander, Winter Rose, Red Hazel, Forsythe's Seedling, Ruckman's Red, Alleghany, Chaltram Pippin, Gowden, Graham's Red Warrior, Walb, Winter Horse, Missouri Pippin, Missouri Red, Leanham, Jackson Red, World's Wonder, (Downing,) Gilpin, (synonyms: Carthouse, Roman Knight, Small Romanite, Gray Romanite, Little Romanite. (Downing;) Winesap, Aunt Peggie, Disharoon, Winter Horse, Sharpe's Greening, Cullasaga, Ben Davis, (synonyms: New York Pippin, Victoria Red, Kentucky Pippin, Baltimore Red, Carolina Red Streak, Funkhouser, (Downing;) Ferdinand, Hemphill, Guilford Red, Green Cheese, (synonyms: Green Crank, Southern Golden Pippin, Green Skin, Yellow Crank, Winter Greening, Winter Cheese, Carolina Greening, Turner's Cheese, (Downing.)

These varieties are supposed to be nearly all seedlings of the Southern States. At page 184 to 198 of the Agricultural Report for 1869 will be found an illustrated paper (by William Saunders) on the subject, of which the above is a condensed abstract.

FACTS FROM OFFICIAL SOURCES.

FAMINE AND FOOD-SUPPLY IN BENGAL.—The Indian branch of the British government is largely occupied with the practical problems growing out of the failure of crops in the Bengal presidency. It is admitted that there are millions of laborers within the district covered by the failure who receive, as the reward of their labor, barely enough for the sustenance of their families in seasons of average prosperity, and therefore have no means of providing for themselves in this emergency; and that there are millions more of ryots (farmers of rented land) whose means are so limited that exorbitant prices must very soon exhaust them. It is also admitted that to depend on the ordinary law of demand and supply for making up the deficiency must inevitably result in widespread starvation. From what sources to obtain the needed supply of food, how it can be seasonably imported and distributed, and how extortionate prices can be prevented, are questions upon the prompt and right solution of which prevention of death by starvation to millions depends. The Indian economist assumes "that there must be abundance of food in Lower Bengal to feed the people throughout the coming distress; and that it is upon keeping down prices and stimulating and equalizing the distribution of food that the government should concentrate its attention." And again, "If the Burmah harvest is to be of any assistance to us, we shall want it here between February and May. The question of transport, therefore, becomes a very important one, and the propriety of trusting to freight being forthcoming exceedingly doubtful. To bring 700,000 tons of rice here in four months we shall want 250 ships of 1,000 tons each, with screw-power to make their voyage short and certain, so that they might each make three trips during the period." Beyond the food in reserve in Bengal, the nearest available source of supply is Burmah. An estimate, based on statistics of export for several years past, makes the normal annual surplus of food in Bengal about 500,000 tons, and in Burmah about the same. This 1,000,000 tons, chiefly rice, would supply about one-thirteenth of the population of Bengal with food one year. The opinion is expressed that in the presidency of Madras there is a surplus of food sufficient to supplement the short harvest in Bengal, but it is impracticable to secure it on account of the disposition of the ryots to hoard it. It is estimated that supplies of wheat might be obtained as follows: from Kurrachee, 30,000 tons; Persian Gulf, 30,000; Egypt, 70,000; Southern Russia, 200,000; Canada, 100,000; The United States, 100,000. This 1,430,000 tons would make 1,400 ship-loads of 1,000 tons each, and if it could be seasonably secured, would supply from seven to eight millions with food for one year.

IRRIGATION IN BRITISH INDIA.—The Statistical Reporter of Calcutta furnishes a list of irrigation works in progress and projected (not including those already completed) in the different provinces of India, and the estimated expenditure required for the completion of each. The total number of these works is 26, and the total estimated cost £20,325,000, or $101,625,000; of this the sum of £18,487,000 is for works having already received government sanction, and the remainder for those as yet only projected. The actual expenditure on those several works up to the first of April, 1872, is placed at £4,589,000. It is represented that, although there are not thus far data sufficiently extended and accurate to establish a positive inference, yet the latest statistics point to the conclusion that past expenditures on irrigating

works have been financially profitable. For works in operation in the provinces of Madras, Bombay, Bengal, Punjab, Sindh, and the northwestern provinces, according to the best available information, the account stands thus: Total capital invested up to the end of the year 1871–'72, £10,659,000; interest at 4 per cent., £426,360. Net income, £890,000.

AREA AND POPULATION OF SWEDEN.—The following facts are stated upon the authority of Dr. Elis Sidenbladh, secretary of the Royal Swedish Bureau of Statistics:

The Scandinavian peninsula consists of the two kingdoms of Sweden and Norway, Sweden occupying 58 per cent. of the total area of 761,500 square kilometers, and Norway 42 per cent. The population is 6,000,000, of which 70 per cent. is in Sweden and 30 per cent. in Norway. The population in 1750 was 1,763,338; 1800, 2,347,303; 1850, 3,482,541; 1870, 4,168,525; 1871, 4,204,177.

Sweden extends, in a northern direction, to 69° 3′ 21″ north latitude; toward the south to 55° 20′ 18″. The entire length of Sweden, north to south, is about 1,500 kilometers; its width 300 to 400 kilometers.

The surface of Sweden consists of 407,446.51 square kilometers * of land and 37,367.49 square kilometers of water. Total, 444,814 square kilometers.

High mountain-ranges divide Sweden from Norway. The highest summits in Sweden are the Sulitelma, 1,874.9 meters in height, the only mountain in that country having glaciers; the Areskutan, 1,472 meters high; the Staedjan, 1,176 meters, and others not beyond 300.

About 8 per cent. of the area of Sweden lies 600 meters above the level of the ocean; the entire central and southern portion, not over 240 meters; about one-third, less than 90 meters. Lakes and running waters occupy an area of 37,367 square kilometers. Over 2,500 kilometers are sea-coast. Among the many rivers are the Angermann-Elf, the Goeta-Elf, the outflow of Lake Wener, famous for the cataract Trolhæta, (111 feet.)

UTILIZATION OF PARIS SEWAGE.—During the last fall the inspectors-general of French agriculture assembled at Gennevilliers to examine the works undertaken by the city of Paris for the purpose of drawing off a portion of the sewage of that city and applying it as a fertilizer to farms. Their conclusions were embodied in a decree of the minister of agriculture, in which prizes are offered to persons who, by the use of these waters, may secure special improvements in production. These prizes will consist of works of art and of medals of gold, silver, and bronze, and will be awarded by a jury, consisting of two inspectors of agriculture, a deputy, a municipal counsellor of Paris, a horticultural gardener, and two agriculturists.

ALCOHOLIC PRODUCTION IN FRANCE.—The production of alcohol in France during 1873 amounted to 1,486,233 hectoliters, or 36,260,006 gallons. Adding the foreign import, 42,477 hectoliters, or 1,122,118 gallons, and the stock in the country amounted to 40,385,124 gallons. Compared with 1872 the above figures indicate a falling off of 302,202 hectoliters, or 7,983,511 gallons. A great reduction is indicated in alcohol from wine and beet-sugar and in imported alcohols. On the contrary, an increased production is indicated in alcohols from farinaceous substances, molasses, fruits, and other substances. The consumption in 1873 amounted to 1,654,759 hectoliters, or 43,717,092 gallons, showing a decrease of 283,029 hectoliters, or 7,576,983 gallons.

* 1 square kilometer = 247.1134 acres, United States. 1 meter = 1.09363 yards, United States.

BEET-SUGAR IN FRANCE.—The amount of juice expressed from the sugar beet in France during the year ending October 31, 1873, was 485,746,810 gallons, a falling off from the previous year of 38,642,523 gallons. Its saccharine qualities, however, were improved, the density being 4, while that of 1872 was 3.9. In 1873 the sugar product was 224,268,210 pounds, a reduction of nearly 20,000,000 pounds compared with 1872. The export amounted to 22,362,382, about half of that of the previous year. French sugars have found in the English markets a formidable rival in Austrian sugars, a fact which sufficiently explains the reduced export. The French ministry proposed additional taxes upon sugar in November last, on the grounds that it was not an article of prime necessity, that the increased market-price of the article would enable it to bear the imposition, and that the pressure of public burdens demands additional sacrifices from this as from other productive interests. The *Journal Pratique d' Agriculturé* combats this measure, and urges that high taxes alone have prevented sugar from becoming an article of general use, and that the proposed increase of taxes will defeat its purpose by restricting production.

MEAT PRICES IN EUROPE.—The increasing dearness of meat is the chronic complaint in England, France, Germany, and Russia. The Saint Petersburg journal *Golas* blames the railroads for this result, their high tariffs and vicious arrangements rendering it impossible to supply the markets. The transit from Moscow to Saint Petersburg, which should not occupy more than thirty-six hours, is lengthened to six days. The accommodations for live stock are so imperfect that about 20 per cent. die on the passage. The temperature of the cars rises to 40° Reaumer. Common roads are so bad and food along the route so scarce that destructive epizootics break out in the droves.

THE NEW ENGLAND AGRICULTURAL CLUB.—This new association, Hon. Daniel Needham, Groton, Mass., president, and Daniel Round, Norfolk, Mass., secretary, held its first public meeting at Waterville, Me., on the 26th, 27th, and 28th of March. It proposes as its objects, institutes for discussion; collection of statistics respecting the leading crops of New England; dissemination of the same through the press; investigations of facts respecting supply and demand; facilities and cost of transportation; and systems of marketing farm products. The principal topics presented were: The meat-supply of our large cities; adaptation in farming; better culture; anatomy and diseases of the horse's hoof; and the resources of the State of Maine.

FRUIT PROSPECTS.—Our correspondent in Wicomico, Maryland, says: Fruit-raising has proved very profitable to farmers; they realize from a few acres thus planted as much as they formerly did from a considerable grain-farm. Peaches, according to quality and earliness of ripening, net from one to two and a half dollars per tree, each season; though the sudden cold of the 24th and 25th, and subsequently the sleet of the 31st of March, have killed this crop for the present year. Strawberries and blackberries, according to thoroughness of culture, net from three to eight hundred dollars per acre; raspberries and grapes promise equally well.

THE PORTUGAL ONION.—Hon. A. V. Dockery, United States consul at Oporto, Portugal, furnishes an interesting account of the onion raised in that Kingdom, which is published below. With reference to testing the adaptability of this valuable variety in this country, the Department has signified its wish for an early importation of the seed. The consul says:

Oporto is the chief port of exportation for the large variety of onion known in trade as the Spanish or Portugal onion. The principal part of the product is sent to the English market, where it commands a much higher price than do the onions of any other variety, on account of mildness of flavor and great size. The average weight of the onion is about two pounds, and I have seen some which weighed as high as five pounds. The yield, with proper cultivation, is, perhaps, extraordinary. I saw a crop this summer of $600 worth made on an acre of ground. This was in August, soon after they had been taken out of the earth.

The cultivation is as follows: In the month of October, the seed is sown in a sheltered spot, in very well manured seed-beds. In about ten days, the plants appear, and are watered in dry weather, weeded, and the surface occasionally stirred with a sharp-pointed stick. The young plants not subjected to any severe frost (for the thermometer seldom falls below 30° F.) enjoy an uninterrupted growth till spring-time. In March they are taken up, being then some 5 to 8 inches in height, and planted from 12 to 15 inches apart, in furrows made by the hoe in well plowed and harrowed land. The furrows are filled to the depth of 3 or 4 inches with well-rotted manure, with which the roots of the young plants are placed in actual contact. A very essential condition of the cultivation of the onion is water. The abundant and timely irrigation of the growing crop requires great and constant care. After transplanting, it has two to five hoeings and weedings. With the last weeding are sown either turnips, maize, or, more rarely, grass-seed. The onion crop is off the ground in August, and sometimes in July. After drying a couple of weeks, they are made up in strings, put into boxes, and ready for shipment.

YIELD AND PROFIT OF MANGEL-WURZEL.—Our correspondent in Plymouth County, Massachusetts, sends us the statistics of a crop of mangel-wurzel produced by Mr. Albert Fearing. Three-fourths of an acre produced 38½ tons, value $10 per ton, $385; cost, 9 cords of manure, $90; seed, $2; plowing, $4; cultivation, $16.50; harvesting, $12; total, $124.50; net profit, $260.50. This is at the rate of 1,708 bushels, or 51⅓ tons, per acre, at a profit of $347.33.

FARMING IN THE BED OF A MILL-POND.—A correspondent in Richmond County, Virginia, reports that he emigrated from New York, and purchased a farm in that county, some seventy acres of which had once been a mill-pond. In 1871 he cleared it of weeds, brush, &c., and ditched where necessary, and has since raised on it, without fertilizers, excellent crops of corn, wheat, rye, and oats. In August, 1872, he sowed on a portion of it buckwheat and rye, sowing both on the same ground at the same time. The buckwheat made a good crop. After it was harvested, the rye came forward rapidly, and afforded much pasture for calves during the winter. When harvested in 1873, it was the best crop he ever saw. Most of it was seven feet high, with long heads and good grain. Some of the straw was sold in Washington for $1.25 per hundred-weight. He also, in 1873, harvested from some of this mill-pond land a bountiful crop of timothy hay, some of the heads of which were over one foot in length.

THE MOST PROFITABLE FERTILIZERS.—A correspondent sends us an account of a discussion by an agricultural association in the parish of Catahoula, Louisiana, respecting the relative advantages of purchasing fertilizers in the market, or producing them on the farm. After interchanges of views, illustrated by statements of experience in trying the one and the other theory, it was decided that for the soil of that parish the manure derived from its productions is not only the cheapest as to cost, and most profitable for the crop to which it is first applied, but is more permanent than foreign fertilizers in its good effects. The principal reason assigned was that it returns to the soil the very ingredients taken from it by the crops from which it is derived. Hence it was recommended that measures be taken to economize manures on the farm in all practicable ways, among which were specified the free use of litter and other absorbents in stables and yards for horses, cows, and hogs, so as to save all the liquid manure; and the saving of all the bones from beef, pork, and every other source, breaking them up, keep-

ing the fragments in a water-tight receptacle until dissolved by ashes or other solvent, and then composting them.

STOCK AND GRAIN IN NEBRASKA.—A correspondent in Thayer County reports that in that section stock have required but little feed, and have wintered well. Also, that more small grain will be sown this spring than heretofore, especially barley, for which the price through the winter has been $1.25 per bushel. As yet no attempt has been made in that county at raising cultivated grasses, the wild grass, which is very good, being the only dependence for hay.

WHEAT PROSPECTS IN SOUTHEAST MISSOURI.—A correspondent in Reynolds County reports that, notwithstanding the chinch-bug for the last two years has been very destructive to the wheat-crop in that and adjoining counties, about 20 per cent. more than average had been sown, and the growing crop was looking better than he had ever seen it before, especially drilled wheat.

ONIONS IN INDIANA.—Our correspondent in Switzerland County writes as follows:

The crops of onions and onion-sets are to us crops of the greatest importance. The red onion, from top-sets, is the kind most relied on and most raised. The ground is prepared in the fall by plowing, and thoroughly pulverizing with the harrow, and as soon as the surface is dry enough, in February and March, the work of planting is commenced. The ground is marked off with a large wooden rake, with the teeth one foot apart. In the rows so made the onion-set is merely stuck in the ground, leaving a space of three inches between each onion. For onions and onion-sets the ground should be thoroughly cultivated and kept clear of weeds, either with a hoe or a small cultivator. From 18 to 25 bushels of sets are planted to the acre, producing, in an average season, from 300 to 350 bushels per acre, (48 pounds to the bushel.) The crop is harvested in the latter part of July, by pulling the onions and throwing them in rows, leaving them for a day, and then gathered and spread thinly on the floors and lofts of out-houses or barns. They are hauled to market within one month from gathering, and packed by shippers in slack-barrels, holding 2½ bushels each, and shipped South. The crop sometimes reaches the aggregate of 120,000 bushels, and is sold to shippers at prices ranging from 40 cents to $1 per bushel. The price has advanced materially, notwithstanding large arrivals of French onions in the New Orleans market during the past two months. Onions are now selling at $1.75 per bushel, with a constantly-increasing demand.

Onion-sets, the crop of which will sometimes amount to over 50,000 bushels, are raised by preparing the ground in the fall and planting the bulbs in rows two feet apart, three inches in the row, and cultivating with a small cultivator. The crop is gathered by cutting the sets off, and gathering and spreading thinly on floors the same as the onions. After the first year the old onions, called "scallions," are taken up to thoroughly cultivate and loosen the ground, and are then replanted. If properly cared for the "scallions" will remain productive for several seasons. The market for sets is South, West, and Northwest, and the time for shipping from September to the latter part of April. For transportation they are packed in barrels holding from 3 to 4 bushels, (28 pounds to the bushel.) The price ranges from $1 to $4 per bushel, and has reached this season $5 per bushel in first hands. The production is about 300 bushels per acre. One bushel of onions produces one bushel of sets. The bottom-lands of the Ohio and Miami Valleys should be the source of supply for the Union.

AGRICULTURAL INDUSTRIES IN FLORIDA.—An intelligent correspondent writing from Florida says that there is a very noticeable desire in the southern part of the State to abandon the cultivation of long-staple cotton for something better. Cultivation of fruit, growing of sugar-cane, and cattle-raising are in popular thought. In the vicinty of Little River one thousand Scuppernong grape-vines have been set, and a number of peach-orchards have been planted; at the same time twenty proprietors in a single neighborhood have started apple, pear, and cherry orchards. All the trees here referred to are from southern nurseries. Our correspondent, however, regards the grass question as of the greatest importance, feed for cattle being of prime need. Guinea-grass he regards as fully meeting the want.

BLUE-GRASS IN ARKANSAS.—Dr. A. Guthrie writes to the Department as follows:

I have a tract of land of 125 acres, cleared land, situated in Van Buren County; its character, good upland, partly valley land. In summer there is good "stock range" throughout this and adjoining counties, but in winter the native grasses are of little value. It has been on my part an object of great solicitude to cultivate a portion of my land successfully in grass suitable for hay and winter pasturage. In the spring of 1872 I sowed with my oats seven acres of timothy, one of blue-grass, and one of red clover. All have done well; but the clover does not seem to withstand the hot, dry season as well as the other two. Having long been a resident in the blue-grass region of Kentucky, I have observed my experiment here with interest, and I can say that while blue-grass does not grow quite as well as in Kentucky, Indiana, and Ohio, it grows finely here, and will succeed and keep green in summer. Mine has afforded pasturage for my horses till the middle of January.

GUINEA-GRASS.—A correspondent writing from Greensborough, Ala., says that Guinea-grass is largely raised in that section; those who have tried it most like it best. He thinks if it could be confined within proper bounds, it would be invaluable. In good years it may be cut from two to three times, and yields an enormous amount of hay. The great trouble experienced by some arises from their neglect to cut it at the proper stage of growth. It ought never to be allowed to go to seed before cutting, as it is then too hard and woody for good hay, but it should be cut when from 2 to 3 feet high, when it makes a palatable, nutritious hay, of which all kinds of stock are very fond. The great and only objection to the grass is, that when it once "takes hold" it can never be eradicated, and, unless great care is taken, it spreads rapidly. It is the earliest grass to make its appearance in the spring, and stock are very fond of it when young and tender.

PROFITS ON HENS.—A farmer of Maine reports his experience in keeping forty hens. He kept an accurate account of expenditure and receipts for one year, beginning in December. He says:

In the course of the year 2 died. On 14th of June, dressed and sold 26 hens for $15.50 On 9th July, had 158 chickens. Lost 6 by hawks and 27 by fire, which left 125. Of this number, 40 were sold as poultry for $39.68; also, one pair Black Cochins for $6. Remaining on hand at end of year, 83—26 to make my stock of hens good, and 57 for which I would not take $57. Number of eggs during the year, 257 dozen, sold for $54.66. Total income, exclusive of loss, $172.84. Total expense, $70.36, leaving balance in favor of hens of $102.48. No credit for eggs used in family, nor for the 27 chickens lost. Therefore, I consider it safe to account a clear profit of $2.50 per head on the hens.

INTER-DEPENDENCE OF AGRICULTURAL AND MANUFACURING INTERESTS.—That farmers and manufacturers are mutual producers and consumers—that is, that each is a consumer of the other's products—is quite plain. It ought to be equally plain that it is for their mutual advantage and profit that they be in juxtaposition. The cost of transportation between them is a tax on both, and it increases with the distance between them. If the price were fixed to the producer, whether of agricultural or mechanical products, then the cost to the consumer must increase with the distance between them; if the price were fixed to the consumer, then the profits to the producer must be diminished as the distance between them increases. As a matter of fact, the cost of intervening transportation is a tax which is divided between them, and this would still hold true were that cost reduced to its minimum. To transportation companies and middle-men distance may "lend enchantment to the view," but he is an unwise farmer who does not do all in his power to encourage manufacturers to locate beside him. A former correspondent of this department, who has emigrated from Indiana to Morgan County, Alabama, calls attention to the great disadvantage agriculture labors under in that section for the reason that it has hitherto been made the

exclusive industry. He says: "If ever a country needed manufactures this certainly does. Our wagons are shipped from Northern Indiana; plows, hoes, and even ax-handles, as well as every other manufactured article, come from the North, although the country abounds in the finest timber for manufacturing purposes."

EGGS OF GRASSHOPPERS IN THE SOIL.—Our correspondent in Martin County, Minnesota, reports: "Our people have been experimenting by taking a quantity of earth and placing it in boxes by the side of the stove, where, in about a week the grasshoppers hatch out; showing that the ground is full of eggs which the frosts of winter have not killed." But since the first freeze kills the young grasshoppers, he thinks there is a fair chance that those hatched in the course of nature, in the spring, may be destroyed in like manner.

PEACH-GROWING IN DELAWARE.—The secretary of the Lincoln Agricultural Association, Sussex County, Delaware, reports to this Department that during the season of 1873, 36,000 baskets of peaches were shipped from that county by Lincoln Station, and 300,000 by the Junction and Breakwater Railroad, in addition to shipments, not reported, by another road through the county.

RESULT OF SEED DISTRIBUTION.—Our former correspondent in Union County, South Carolina, reports that, as the result of the introduction into that county by this Department, through him, of four quarts of Tappahannock wheat, that variety has now come into general use, and is regarded as the best produced. He also represents that the turnip-crop and several varieties of garden-products have been much improved in consequence of the distribution of new varieties of seeds which were first obtained from the Department and tested on a small scale.

MINERALS IN SOUTH CAROLINA.—Mr. Charles Petty, for the past eight years our correspondent in Union County, South Carolina, has recently taken charge of a female seminary at Limestone Springs, Spartanburgh County. He reports that the seminary building rests on the bed of marble from which the "South Carolina block" in the Washington monument was taken. He adds that blue limestone and iron-ore are abundant in that locality, and that a "flexible sandstone" and lead in unknown quantity exist there.

MARKET-PRICES OF FARM-PRODUCTS.

The following quotations represent the state of the market, as nearly as practicable, at the beginning of the month.

Articles.	Prices.	Articles.	Prices.
NEW YORK.		NEW YORK—Continued.	
Flour, superfine State ....per bbl.	$5 60 to $6 15	Rye .....per bush.	$0 98 to $1 03
extra State.....do...	6 35 to 6 70	Barley.....do....	1 85 to — —
superfine western.....do...	5 60 to 6 15	Corn.....do....	80 to 88
extra to choice western, per barrel.....	6 25 to 11 00	Oats .....do....	56 to 63
common to fair southern extra, per barrel.....	6 40 to 7 25	Hay, first quality.....per ton.	24 00 to 25 00
good to choice southern, per barrel.....	7 30 to 11 00	second quality.....do....	21 00 to 23 00
Wheat, No. 1 spring.....per bush.	1 57 to 1 62½	Beef, mess.....per bbl.	10 00 to 11 50
No. 2 spring.....do....	1 50 to 1 56½	extra mess.....do...	12 50 to 13 50
winter, red, western.do....	1 58 to 1 65	Pork, mess.....do...	— — to 16 75
winter, amber, western, per bushel.....	1 66 to 1 68	extra prime.....do...	14 00 to 14 50
winter, white, western, per bushel.....	1 50 to 1 90	prime mess.....do...	14 75 to 15 75
		Lard .....per lb.	9⅝ to 10
		Butter, western .....do..	30 to 38
		State dairy.....do..	35 to 45
		Cheese, State factory.....do..	15 to 16¾
		western factory.....do..	13 to 16

Market-prices of farm-products—Continued.

Articles.	Prices.
NEW YORK—Continued.	
Cotton, ordinary to good ordinary, per pound	$0 12⅞ to $0 15¼
low middling to good middling, per pound	15⅝ to 18⅝
Sugar, fair to good refining per lb.	7 4-10 to 7¾
prime refining do	7 13-16 to 7⅞
Tobacco, lugs do	4½ to 6¼
common to medium leaf, per pound	6½ to 8½
Wool, American XXX and picklock per lb.	62 to 70
American X and XX do	45 to 60
American combing do	52 to 60
pulled do	25 to 33
California spring clip do	13 to 35
California fall clip do	20 to 27
Texas do	23 to 35
BOSTON.	
Flour, superfine western per bbl.	5 50 to 6 00
western extras do	6 25 to 8 00
western choice do	8 50 to 10 00
southern extras do	6 25 to 6 75
choice Baltimore do	9 00 to 10 00
Wheat per bush.	1 50 to 1 85
Rye do	1 10 to 1 12
Barley do	1 75 to 2 15
Corn do	89 to 93
Oats do	60 to 66
Hay, eastern and northern per ton.	24 00 to 25 00
western choice do	24 00 to 25 00
Beef, western mess per bbl.	10 00 to 12 00
western mess extra do	13 00 to 14 00
Pork, prime do	16 75 to 17 00
mess do	14 50 to 15 00
Lard per lb.	9⅝ to 10¼
Butter, N. Y. and Vt. do	33 to 39
western do	30 to 38
Cheese, N. Y. and Vt. factory do	15 to 17
western factory do	14 to 16½
Sugar, fair to good refining do	7½ to 7¾
Tobacco, lugs do	6½ to 8
common to medium leaf per lb.	8½ to 10
Cotton, ordinary to good ordinary per lb.	13 to 15½
low middling to good middling per lb.	16 to 18½
Wool, Ohio and Pa do	50 to 60
Michigan do	45 to 53
other western do	44 to 52
pulled do	25 to 55
combing fleece do	60 to 64
California do	17 to 36
Texas do	20 to 37
PHILADELPHIA.	
Flour, superfine per bbl.	5 00 to 5 35
Pa. extra do	— — to 6 37½
Pa. family and fancy do	7 50 to 8 00
western extra do	6 37½ to 7 50
western family do	7 50 to 8 75
Wheat, winter, red per bush.	1 58 to 1 64
winter, amber do	1 70 to 1 76
winter, white do	1 85 to 1 92
spring do	1 48 to 1 52
Rye do	95 to — —
Barley do	1 75 to 1 90
Corn do	81 to 84
Oats do	58 to 65
Hay, fresh baled per ton.	22 00 to 24 00
common to fair shipping do	20 00 to 22 00
Beef, western mess per bbl.	8 00 to 10 00
extra mess do	9 00 to 12 00
Warthman's city family do	16 00 to — —

Articles.	Prices.
PHILADELPHIA—Continued.	
Pork, mess do	$16 50 to $17 00
prime mess do	16 00 to — —
prime, extra do	14 50 to — —
Lard per lb.	9⅜ to 12½
Butter, choice middle State do	40 to 44
choice western do	35 to 42
Cheese, N. Y. factory do	16½ to 17½
Ohio factory do	15 to 16½
Sugar, fair to good refining do	7⅞ to 7¾
Cotton, ordinary to good ordinary per lb.	12¼ to 15
low middling to good middling per lb.	16 to 17¾
Wool, Ohio X and XX do	55 to 57
Ohio combing do	— to 65
pulled do	46 to 50
unwashed, clothing and combing per lb.	37 to 45
BALTIMORE.	
Flour, superfine per bbl.	5 00 to 5 50
extra do	6 50 to 8 00
family and fancy do	8 25 to 10 50
Wheat, white, fair to choice, per bushel	1 60 to 1 85
amber per bush.	1 60 to 1 80
red do	1 50 to 1 60
Rye, common to prime do	85 to 89
Corn, white southern do	80 to 84
yellow southern do	80 to 83
Oats, southern do	61 to 66
western do	59 to 63
Hay, Pennsylvania per ton	17 00 to 20 00
Maryland do	16 00 to 20 00
western do	16 00 to 20 00
Beef, Baltimore mess per bbl.	15 00 to 20 00
extra do	23 00 to 25 00
Pork, mess do	16 50 to 16 75
Lard per lb.	9¾ to 10¼
Butter, western do	28 to 38
eastern do	35 to 42
Cheese, eastern cutting do	16¾ to 17
western cutting do	16½ to 17
Sugar, fair to good refining do	7⅝ to 7⅞
Tobacco, lugs per cental.	5 00 to 7 00
common to medium leaf per cental	7 00 to 8 00
Cotton, ordinary to good ordinary per lb.	13 to 14½
low middling to middling per lb.	15½ to 16½
Wool, fleece, common to fine do	45 to 50
tub do	55 to 60
unwashed do	35 to 38
pulled do	35 to 40
CINCINNATI.	
Flour, superfine per bbl.	5 00 to 5 50
extra do	6 35 to 6 60
family and fancy do	6 70 to 8 00
Wheat, red winter per bush.	1 37 to 1 40
hill winter do	1 43 to 1 47
white winter do	1 45 to 1 50
Rye do	1 03 to 1 05
Barley do	1 45 to 1 70
Corn do	63 to 69
Oats do	50 to 57
Hay, baled, No. 1 per ton.	13 00 to 15 00
lower grades do	9 00 to 12 00
Beef, plate per bbl.	14 00 to — —
Pork, mess do	16 00 to 16 25
Lard per lb.	9⅛ to 9½
Butter, choice do	36 to 40
prime do	34 to 36
Cheese, factory do	16½ to 17
pine-apple do	— — to — —

Market-prices of farm-products—Continued.

Articles.	Prices.		
CINCINNATI—Continued.			
Sugar, N. O., fair to good ...do...	$0 8¼	to	$0 9
prime to choice.....do...	9¼	to	9¾
Tobacco, lugs.....do...	6	to	15
leaf .....do...	8	to	26½
Cotton, ordinary to good ordinary.....per lb.	12	to	14
low middling to good middling.....per lb.	15	to	17
Wool, fleece-washed, common to fine .....per lb.	45	to	47
tub-washed .....do...	48	to	50
unwashed, clothing...do...	30	to	32
unwashed, combing...do...	33	to	35
pulled .....do...	35	to	38
CHICAGO.			
Flour, white winter, fair to good, per barrel	7 00	to	8 00
Flour, white winter, choice, per barrel	8 50	to	9 25
Flour, red winter .....per bbl.	5 50	to	7 00
medium to fancy spring extra, per barrel.....	5 75	to	6 75
spring superfine... per bbl	3 00	to	4 75
Wheat, No. 1 spring.....per bush.	1 25	to	— —
No. 2 spring.....do...	1 19	to	1 22½
No. 3 spring.....do...	1 17	to	— —
Corn, No. 2.....do...	58½	to	63¼
Oats, No. 2.....do...	42½	to	48
Rye, No. 2.....do...	90	to	93
Barley, No. 2 .....do...	1 52	to	— —
Hay, timothy .....per ton	10 50	to	14 00
prairie.....do...	8 00	to	10 00
Beef, mess .....per bbl.	8 75	to	9 00
extra mess.....do...	9 75	to	10 00
Pork, mess .....do...	15 00	to	15 50
prime mess .....do...	13 00	to	13 25
extra prime.....do...	11 75	to	12 00
Lard .....per cental.	9 20	to	9 22½
Butter, choice to fancy.....per lb.	36	to	40
medium to good.....do...	32	to	34
Cheese, N. Y. factory .....per lb.	17	to	18
Ohio and western factory .....per lb.	16	to	17
Sugar, N. O., prime to choice..do...	9	to	9¼
common to fair..do...	7½	to	8½
Wool, tub-washed.....do...	48	to	55
fleece-washed .....do...	36	to	48
unwashed.....do...	25	to	32
pulled.....do...	35	to	40
SAINT LOUIS.			
Flour, spring.....per bbl.	— —	to	— —
winter .....do...	5 20	to	8 50
Wheat, red winter.....per bush.	1 30	to	1 51
white winter.....do...	— —	to	— —
spring .....do...	1 23	to	1 26
Corn .....do...	60½	to	63½
Rye .....do...	98	to	— —
Oats .....do...	50	to	55
Barley.....do...	1 30	to	1 72½
Hay, timothy.....per ton	13 50	to	21 00
Beef, prime mess.....per bbl.	— —	to	— —
mess .....do...	13 00	to	— —
extra mess .....do...	— —	to	— —
Pork, mess.....do...	15 50	to	16 25
Lard .....per lb.	8¼	to	9¾
Butter, choice.....do...	32	to	34
inferior grades .....do...	20	to	30
Cheese, Ohio and N. W. factory.....per lb.	16	to	17
N. Y. factory.....do...	16	to	17

Articles.	Prices.		
SAINT LOUIS—Continued.			
Sugar, N. O., common to fine..do...	— —	to	— —
prime to choice..do...	— —	to	— —
Cotton, ordinary to good ordinary .....per lb	$0 11¼	to	$0 13¾
low middling to good middling.....per lb.	15	to	16½
Wool, tub-washed.....do...	51	to	53
unwashed, combing...do...	30	to	35
fleece .....do...	40	to	46¼
NEW ORLEANS.			
Flour, superfine.....per bbl.	4 75	to	— —
extra.....do...	5 25	to	6 75
choice to fancy.....do...	7 25	to	9 50
Corn, white.....per bush.	75	to	76
yellow .....do...			80
Oats .....do...	62	to	65
Hay, choice.....per ton	21 00	to	22 00
prime .....do...	17 00	to	19 00
Beef, Texas.....per bbl	12 00	to	— —
Philadelphia.....do..	16 00	to	16 25
Fulton market..per half bbl.	12 00	to	— —
western .....do...	9 00	to	9 25
Pork, mess.....do...	16 87½	to	17 00
Lard .....per pound.	9	to	10¼
Butter, choice Goshen.....do...	45	to	46
western .....do...	33	to	38
Cheese, choice western factory .....do...	17	to	— —
N. Y. cream.....do...	19	to	20
Sugar, fair to full fair .....do...	7	to	7½
prime to strictly prime .....do...	7½	to	7¾
clarified, white and yellow.....do...	9	to	9¼
Cotton, ordinary to good ordinary .....do...	12¼	to	14½
low middling to good middling.....do...	15⅝	to	17½
Tobacco, lugs .....do...	4½	to	5½
low leaf to medium leaf.....do...	5½	to	8
Wool, lake.....do...	nominal.		
SAN FRANCISCO.			
Flour, superfine.....per bbl.	4 50	to	5 00
extra.....do...	5 25	to	5 50
family and fancy.....do...	5 75	to	6 00
Wheat, California.....per cental.	1 90	to	2 00
Oregon.....do.....	1 90	to	2 00
Barley.....do.....	1 55	to	1 75
Oats.....do.....	1 60	to	1 80
Corn, white.....do.....	1 65	to	1 70
yellow.....do.....	1 65	to	1 70
Hay, state.....per ton	16 00	to	18 50
Beef, mess.....per bbl.	8 50	to	9 00
family mess.....half bbl	9 00	to	10 00
Pork, mess.....per bbl.	17 00	to	17 50
prime mess.....do ...	16 50	to	17 50
Lard.....per lb.	10	to	13
Butter, overland .....do...	15	to	25
California.....do...	30	to	35
Oregon .....do...	15	to	20
Cheese.... .....do...	15	to	18
Wool, native.....do...	14	to	16
California.....do...	16	to	22
Oregon .....do...	16	to	22

LIVE-STOCK MARKET.

Articles.	Value.		
NEW YORK.			
Cattle, extra beeves....per cental.	$12 75	to	$13 00
good to prime.....do....	— —	to	12 50
common to fair.....do....	10 00	to	— —
milch-cows.....per head.	35 00	to	80 00
calves.....per cental.	6 50	to	10 50
Sheep, good to extra .....do....	7 25	to	9 25
Swine, common to fair.....do....	5 50	to	6 00
BOSTON.			
Cattle, choice.....per cental.	7 25	to	7 50
extra.....do....	6 50	to	7 00
first quality.....do....	5 50	to	6 00
second quality.....do....	4 50	to	5 00
third quality.....do....	—	to	4 00
working oxen.... per pair.	100 00	to	250 00
milch-cows with calves, per head.....	35 00	to	95 00
yearlings.....per head.	10 00	to	18 00
Sheep, extra.....do....	5 25	to	7 25
inferior grade.....do....	3 00	to	4 75
Swine.....per cental.	6 25	to	6 50
PHILADELPHIA.			
Cattle, common to choice, per cental	4 50	to	7 75
Sheep, common to choice, per cental	6 00	to	8 62½
Swine, corn-fed .....per cental.	8 59	to	9 00
BALTIMORE.			
Cattle, best beeves.....per cental.	6 25	to	7 12
first quality.....do....	5 25	to	6 25
medium.....do....	4 75	to	5 25
ordinary .....do....	3 12	to	4 75
general average.....do....	5 87		— —
most of the sales between .....per cental.	5 50	to	6 50
Sheep.....do....	4 50	to	8 50
Swine, corn-fed.....do....	8 00	to	8 37½
CINCINNATI.			
Cattle, good to prime butchers' steers.....per cental	5 25	to	5 75
common to good medium, per cental.....	3 50	to	5 00
milch-cows.....per head	30 00	to	60 00
Sheep, common .....per cental.	4 50	to	5 50
good to prime butchers', per cental.....	5 50	to	7 00
Swine, shipping grades, per cental.....	5 25	to	5 90
good to prime butchers', per cental	6 10	to	6 20
CHICAGO.			
Cattle, extra graded steers, 1,400 to 1,500 pounds, per cental.....	6 15	to	6 50

Articles.	Value.		
CHICAGO—Continued.			
Cattle, choice beeves, 3 to 5 years old, 1,250 to 1,450 pounds, per cental.....	$5 65	to	$6 00
good beeves, 1,200 to 1,300 pounds..... per cental.	5 25	to	5 60
medium grade, 1,150 to 1,300 pounds..per cental.	5 00	to	5 25
lower grades, natives, per cental	3 90	to	5 00
Texans, choice corn-fed, per cental	4 50	to	5 25
Texans, North wintered, per cental.....	3 75	to	4 25
Texans, through-droves, per cental	2 75	to	3 50
milch-cows.....per head.	— —		— —
veal calves.....do....	— —		— —
Sheep, poor to medium, per cental.	5 50	to	6 50
good to choice.....do....	7 25	to	8 12½
Swine, good to extra .....do....	5 35	to	6 05
inferior to medium..do....	5 10	to	5 45
SAINT LOUIS.			
Cattle, choice native steers, 1,300 to 1,600 pounds, per cental.....	6 00	to	6 25
prime second class, 1,150 to 1,400 pounds, per cental	5 50	to	5 75
good third grade, 1,050 to 1,300 pounds..per cental	4 25	to	4 75
fair butchers' steers, 1,000 to 1,200 pounds, per cental.....	4 50	to	4 75
inferior native grades, per cental	2 75	to	4 50
Texans and Cherokees, corn-fattened, per cental.	3 50	to	4 00
inferior.....per cental.	2 00	to	3 00
Sheep.....do....	2 50	to	5 60
Swine .....do....	5 00	to	5 25
Horses, plug.....per head.	30 00	to	60 00
street-car horses ....do....	80 00	to	90 00
good work-horses...do....	85 00	to	100 00
driving-horses .....do....	100 00	to	140 00
heavy draught.....do....	125 00	to	165 00
Mules, 14 to 15 hands high..do....	50 00	to	100 00
15 to 16 hands high..do....	115 00	to	165 00
extra .....do....	150 00	to	200 00
NEW ORLEANS.			
Cattle, Texas beeves, choice, per head.....	40 00	to	55 00
first quality.....per head.	35 00	to	40 00
second quality .....do....	20 00	to	28 00
western beeves, per cental	10 00	to	12 50
milch-cows .....per head.	35 00	to	100 00
calves .....do....	7 00	to	10 00
Sheep, first quality.....do....	4 00	to	5 00
second quality .....do....	3 00	to	4 00
Swine.....per cental.	5 00	to	7 00

FOREIGN MARKETS.

WHEAT.—The month of March, in Europe, was generally mild, with, however, a wintry reaction which pervaded the whole continent about the middle of the month. Ice re-appeared at Odessa and at many other points. This was followed by more seasonable weather. These variations created considerable sensitiveness in the markets. Advices from the United Kingdom still indicate short supplies and an anxious outlook to the coming harvest. Weekly deliveries in March show an average falling off, as compared with last year, of 5,667 quarters, the deficiency of January and February amounting to 400,000 quarters. To supply bread to the British nation till the end of August, nearly 7,000,000 quarters will be required, or nearly half the reported stocks at New York and other great supply markets. French farmers have sold out their stock with unusual closeness, and the wants of Southern Europe will probably divert early deliveries of the next harvest from the United Kingdom. The weekly imports of foreign wheat during the four weeks ending March 21, respectively, were as follows: 1,120,694 quarters, 800,764 quarters, 910,533 quarters, and 639,537 quarters. The London averages during the third week of March were 64*s.* 11*d.* on 1,533 quarters. The wheat-trade of France shows an upward tendency. In Paris, California brought 68*s.* 9*d.* per quarter, American red winter 63*s.* 6*d.*; spring ditto, 62*s.* In Mark Lane, London, Essex, and Kent, new white brought from 53*s.* to 66*s.* per quarter; ditto red, 55*s.* to 62*s.*; Norfolk, Lincolnshire, and Yorkshire, new red, 55*s.* to 60*s.* Of foreign wheats, Dantzic, mixed, was quoted 58*s.* to 69*s.*; Konigsberg, 58*s.* to 68*s.*; Rostock, 61*s.* to 67*s.*; Silesian red, 56*s.* to 57*s.*; ditto white, 61*s.* to 63*s.*; Pomerania, Mecklenburgh, and Uckermark, red, 58*s.* to 60*s.*; Russian hard, 52*s.* to 55*s.*; Danish and Holstein, red, 58*s.* to 60*s.*; American, 55*s.* to 57*s.*; Chilian, white, 62*s.*; California, 65*s.*; Australian, 67*s.* to 69*s.*

In Liverpool, American white was quoted at 12*s.* 6*d.* to 12*s.* 9*d.* per cental; red winter and southern, 12*s.* to 12*s.* 2*d.*; No. 1, spring, 12*s.* to 12*s.* 6*d.*; Canadian white, 12*s.* 9*d.* to 13*s.*; ditto red, 12*s.* to 12*s.* 2*d.*; California white, 12*s.* 6*d.* to 13*s.*; Chilian, 12*s.* to 12*s.* 2*d.*; Australian, 14*s.*; Spanish white, 12*s.* 2*d.* to 12*s.* 5*d.*; Danubian, 7*s.* to 9*s.*; Ghirka, 11*s.* 6*d.* to 12*s.*; Egyptian, 10*s.* to 12*s.* 2*d.*

FLOUR.—The third week in March opened, in London, upon moderate supplies, both of English and foreign flour, yet the trade was quite slow upon English samples at the prices of the previous week. In foreign flour prices were unchanged, but the demand was less urgent. The Paris market collapsed 4 francs per 157 kilograms on flour for consumption, the range being from 48*s.* to 49*s.* 4*d.* per 280 pounds. In Mark Lane, London, the best town households brought from 50*s.* to 57*s.* per sack of 280 pounds; best country households, 44*s.* to 46*s.*; Norfolk and Suffolk, 38*s.* to 43*s.*; American, per barrel, 28*s.* to 29*s.*; extra, 29*s.* to 31*s.* In Liverpool English and Irish superfines were quoted at 44*s.* to 45*s.* 6*d.* per 280 pounds; extra ditto, 45*s.* 6*d.* to 50*s.*; French, 56*s.* to 60*s.*; Spanish, 49*s.* to 52*s.* 6*d.*; Trieste and Hungarian, 66*s.* to 78*s.*; Chilian and Californian, 46*s.* to 52*s.*; American, Western States, per 196 pounds, 30*s.* to 32*s.*; extra State, 31*s.* to 33*s.*; Baltimore and Philadelphia, 30*s.* to 32*s.*; Ohio, 31*s.* to 35*s.*; Canadian, 33*s.* to 37*s.*

MAIZE.—In Mark Lane, London, white is quoted at 40*s.* to 44*s.* per quarter; yellow, 37*s.* to 40*s.* In Liverpool American white brought 40*s.* to 40*s.* 6*d.* per 480 pounds; ditto yellow, 40*s.*; Danubian, 38*s.* to 38*s.* 6*d.*; Galatz, 40*s.*